ELECTRICAL WEST

WITH WHICH IS CONSOLIDATED
THE JOURNAL OF ELECTRICITY

June, 1933

The Convention In Print

Guts, Glue and Glee

Not nice refined words—but packed with a primitive meaning that befits these restless times.

Guts--The stamina to tackle any job, no matter how hopeless, how uninspiring. In champions it's the "fighting heart"—the courage that won't admit defeat, the will to carry on against any odds. Every man and woman in the electrical industry needs that kind of backbone today.

Glue--The ability to stick to it—to hold fast together. If there ever was a time when the industry needed the strength that comes from unity, from playing the game together, this is it. Principles, ideals and policies are meaningless without the glue to make them tangible. The electrical business needs men with this glue in their makeup.

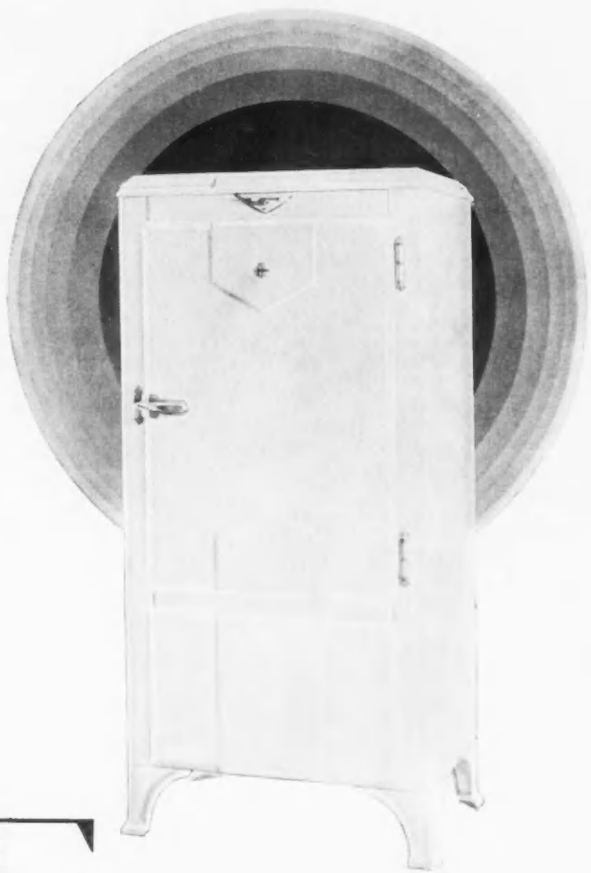
Glee--A happy heart and a smile, the cheerfulness of men and women who like their work and believe in it. Not the ballyhoo of false optimism but the sincerity that comes from faith in the future. The genuine friendship, the spirit of give and take that makes cooperating real team play. All these are wanted in this man's industry.

With Guts, Glue and Glee bound together with the common interest—electricity—nothing will stop the onward march of the electrical industry.

McGraw-Hill Company of Calif.

Fifty Cents Per Copy

These sensational selling points turn prospects into *Customers*



Put yourself in the place of a man or woman who is about to buy an electric refrigerator. Then look at this new All-Porcelain Frigidaire. Look at it from the viewpoint of a buyer who is hard to please.

Now do the same thing with any other refrigerator on the market. Then tell yourself which one *you* would buy.

Frigidaire, of course! And for many sound and convincing reasons. The new All-Porcelain Frigidaire offers a combination of selling advantages never before built into any one refrigerator.

Here is the famous 2-cylinder unit stepped up 20% in efficiency—tremendous ice freezing capacity—¼ more food space in a cabinet of the same outside dimensions—automatic ice tray releasing—automatic defrosting—space for frozen storage—adjustable shelves—double Hydrator capacity—interior light—tall bottle space. And the panelled cabinet of Porcelain-on-steel sets a new style in refrigerator design and beauty.

With all of these advantages—with lower prices—and with Frigidaire's individualized sales service—Frigidaire leads in offering Utility Companies greater profit opportunities in 1933. Frigidaire Corporation, Subsidiary of General Motors Corp., Dayton, O.

And for the prospect who wants a low-priced quality refrigerator there is a Frigidaire that can be installed at $96 plus freight—and that uses no more current than one ordinary lamp bulb.

Frigidaire

A GENERAL MOTORS VALUE

SEE OUR DISPLAY AT THE CENTURY OF PROGRESS EXPOSITION

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), June, 1933, Vol. 70, No. 6. Published monthly by the McGraw-Hill Company of California, 883 Mission St., San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Printed in U.S.A. Subscription rate in U.S. and U.S. possessions, $2 per year; Canada, $2.50 including duty; all other countries $3 gold (thirteen shillings). Single copy, 25c.

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Get the Facts

YOU—as a member of the electrical industry—should be concerned about everything that happens in or to the industry. Whatever affects any one branch affects every other branch in some degree—affects *you*. Right now, in June, 1933 the electric light and power companies of the West need your support, your confidence, your favor. They need your help.

¶ Legislators and regulatory commissions in every state are seeking to reduce rates or increase taxes — sometimes both. Civic groups are clamoring for special discounts or concessions. Utility operations are seriously hindered by legislative impositions in some states. Sales promotional programs are rendered ineffective in others. Municipal ownership agitation threatens to remove from diversified systems the bread-and-butter load which makes the benefits of electric service available to all classes of people—including the farmers.

¶ These factors may not seem close to your home. They may not seem to threaten your security. Perhaps you think they are none of your business. But remember, by aiming its ax at a branch, each imposition threatens mortal injury to the oak—to the whole electrical industry. What hurts the utilities hurts you, too. When revenues are decreased, either by general business inactivity or lower rates or increased taxes, large-scale buying and building is impossible. And large-scale support of *your* industry is impossible.

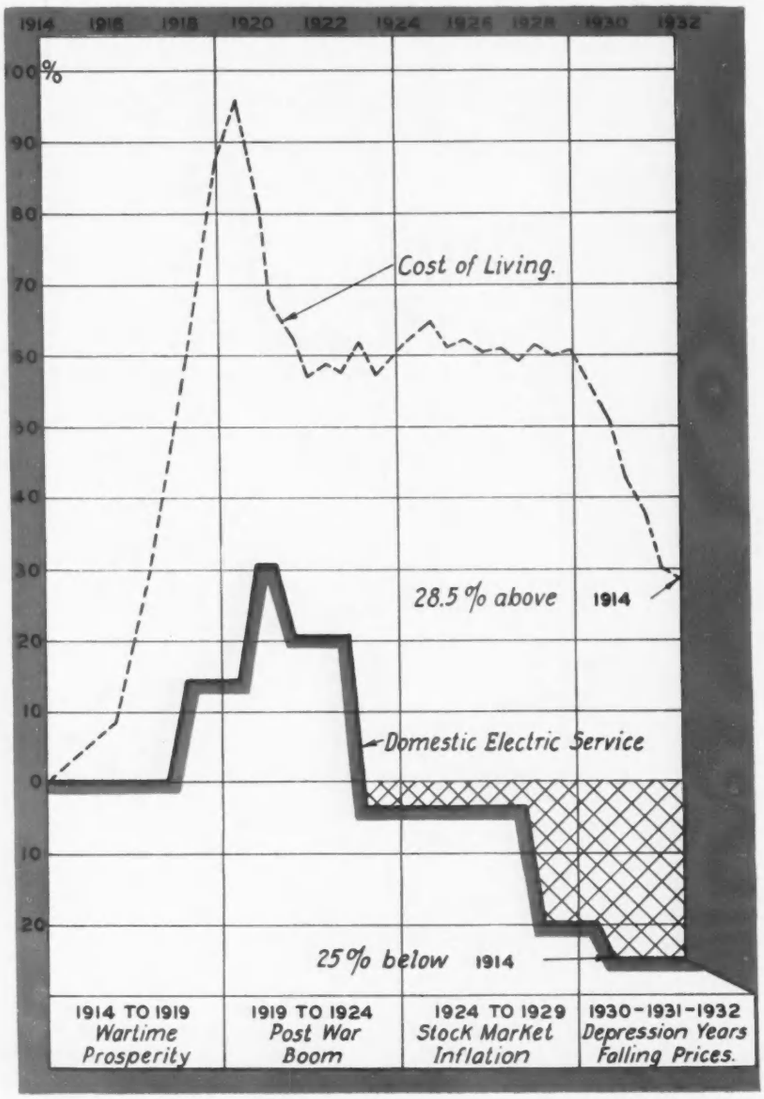
¶ You may think you know the facts—but do you? So that you may understand the position of the utilities and judge for yourself, so that you may answer accurately and authoritatively the questions of your neighbors, a brief story has been assembled in the following pages. Read on—and GET THE FACTS.

Pacific Coast Electrical Association

447 Sutter St., San Francisco

PCEA

Electricity Already is



Cost of living data compiled by U. S. Bureau of Labor Statistics for San Francisco; cost of electricity based on San Francisco rates for domestic uses of from 20 to 60 kw.-hr.

RATES are the price of electricity. In the last three years other prices have dropped pretty fast — and many people wonder why rates have not fallen as fast and as far. The truth is that the price of electricity has come down far more than the cost of living. All the time commodity prices were high, during the prosperity period, rates were being reduced.

¶ Look at the chart. It shows that while prices generally now are 28.5 per cent higher than in 1914, electricity is 25 per cent *lower*. In other words, rates today are nearly 54 per cent below the cost of living. Electricity already is cheap. You noticed the big drop in other prices because they climbed so high. But rates never were very high, so they did not have so far to drop.

Cheap . . .

¶ Even so, some people say that there still is room for reduction. As a matter of fact, if utilities are forced to reduce rates further, they may not be able to survive. Rates, just like any price, are determined by three things: cost of manufacturing and selling, interest, and taxes. The cost of manufacturing and selling, to a great extent, is fixed. There is a definite investment in equipment (some of it, bought to supply the huge demand of a few years ago, is idle now—but it must be paid for); equipment wears out, so a depreciation reserve must be kept up; maintenance must be provided; men must be employed for operation; fuel must be bought. Fuel prices and operating costs are down, but these savings are offset by the decrease in kilowatt-hour consumption. When lots of kilowatt-hours are used, the cost of each is proportionately low because the total cost is spread over so many. But when fewer are sold, as at present, the cost of each is higher, so that savings just about balance increased cost.

¶ Similarly, utilities have little control over interest or taxes. Interest rates cannot be changed. And taxes cannot be lowered—the recent legislature has, in fact, materially increased them, as has the national Congress. This means the cost of each kilowatt-hour goes up a little, making rate reductions even more remote. If taxes were lowered, *then* rates could be reduced. Why isn't more emphasis placed on this point? Why do the people who campaign for lower rates never mention that? Is it just to arouse prejudice?

¶ The utilities foresaw that the rate question would be raised if a depression came . . . long ago they asked for permission to set aside a "rainy day" reserve so rates could be lowered in times like these. But representatives of consumers decided that the public should have the benefit of lower rates whenever this was possible. That is why rates came down when other prices went up—and why rates cannot come down any lower today.

¶ Utilities want lower rates. It means higher consumption, better relations, more stable business. And you would be able to sell more of your products and services—make more money. But the only way rates can be lowered now is for taxes to decrease or consumption to increase. So let's all work to accomplish either of these—or both. It is the one real way.

PACIFIC GAS AND ELECTRIC COMPANY

OWNED . OPERATED . MANAGED BY CALIFORNIANS

P · G · and E ·

Investment Confidence Essential to Progress

¶ Electricity is so necessary nowadays that no community can grow without it . . . new industries cannot be attracted, business cannot prosper. It takes real money to build a good electric system. In many communities, local capital is not available in sufficient amounts to provide adequate electric service. Outside help is needed.

¶ San Diego's experience is typical. The original light plant here was started by local men . . . with courageous hearts but little capital. Demands for service grew faster than their ability to bring in new capital. A financial crisis threatened. Then, in 1904, the Byllesby organization entered the situation. Outside capital was induced to invest in the little local enterprise . . . engineering talent, construction skill, modern business and accounting methods were introduced. And so the Company grew . . . grew with San Diego.

¶ Later, large investments were made to interconnect the Company's plants with other systems, to insure continuity of service. As a result, the San Diego Company has helped others . . . and, in turn, has been helped by others in time of need.

¶ By providing sufficient capital to insure a system growth commensurate with public demands . . . by furnishing good electric service at reasonable rates . . . the electric industry has developed a great electrical market, helping the public to avail themselves of the advantages of electric service, helping the industry as a whole to expand. The industry is growing . . . and the West is growing. Additional capital must be invested to provide for future growth. Anything that disturbs confidence in sound investment, such as unwarranted attacks on the industry by agitators and radical politicians, is harmful to the industry and to the public it serves. Everyone in the industry should be interested in seeing that sound investments get the protection they deserve. The industry and all its parts will grow only as investment confidence is preserved. You prosper more as the industry grows and prospers.

San Diego Consolidated Gas and Electric Company

Credit *Must Be Protected*

EVERY man values his credit. You know what a good credit rating means—you go to all ends to make certain that the people with whom you do business have confidence in you. So it is with electric light and power companies. Hundred thousand-horsepower generators cannot be bought at Woolworth's. Neither can any of the other things that make up a power system. Money—lots of it—is required to supply the equipment required for dependable service. The power companies of the West required credit to build their systems. In building systems they built an electrical market and an electrical industry to supply the market. To a great degree, then, the credit extended through the power companies is responsible for the fact that the West is the greatest electrical section in the Union—that there is an electrical market here.

¶ Credit hinges on financial stability. If taxes become confiscatory or if rates are cut so low that interest on investments is not earned, the financial stability of the utilities is threatened. If the ability to finance readily at low money rates—or any other phase of credit—is hurt, the whole industry suffers.

¶ A real publicly-owned utility is one which is owned by th e public. Not indirectly, but directly. The Edison Company is owned by more than 127,000 people who hold its stock. These people invested their money, bought a part of the Edison Company because they had faith in its credit—in its ability to meet its obligations. These investors had faith that the utility would receive fair treatment from the public. Perhaps you are one of them. You know then that the credit of the company is very important to you—and to hundreds of others whose savings are in banks and insurance companies which hold our bonds.

¶ The power company business is your business. Their investment is your investment. Help protect that business—not to help "a company" but to help the public which the company serves.

Southern California Edison Company Ltd.

What Good Regulation *Means*

GOOD regulation helps everyone. It guarantees that the consumers will be able to buy electricity at fair rates—at rates which help industries to grow, which make rural electrification possible, which expand domestic consumption. This creates a market for electrical goods and services—makes lower rates possible.

¶ By being permitted to earn a fair return, utilities benefit also. Under good regulation they can obtain money at reasonably low interest and thus finance expansion which will keep them in step with progress.

¶ Utilities welcome sound regulation commissioners who understand utility problems. But they protest against any invasion of the regulatory field by ill-advised legislators who do not understand these problems. And the regulatory bodies agree with this. Much of the legislation will benefit no one; if it cripples the utilities it hurts the factories, businesses and homes which depend on utility service. Such regulation is not in the public interest, good legislation is.

¶ Good regulation means sound utilities. Sound utilities are necessary for healthy communities. This means success in your work. Isn't it a fact worth remembering?

•

Coast Counties Gas and Electric Company

Sell ELECTRICAL

¶ It is harder to sell electrical goods nowadays. It is harder to sell anything—people are more careful and deliberate in their buying. Consequently, even with the same number of salesmen working, electrical volume has dropped. So let's all be salesmen. Each one of us can cure our own depression—and help the industry cure its.

¶ Our competition isn't between ourselves. It is between electrical goods and all other goods. If we all go out and Sell Electrical, we keep non-electrical goods out. Every time any of us—dealer, contractor, wholesaler, manufacturer or power company employee—sees a chance to push electricity, let's do it! Even if it is not exactly in our line, let's help some other fellow in the industry. And he will help us. We can make our own industry hum, anyhow.

¶ First, we must learn the selling points. You talk more convincingly and authoritatively about a car if you own one, don't you? Well then, let's learn the selling points of electrical goods first-hand—by using them.

The Southern Sierras Power Company

The Nevada California Power Company

Sales, *Like Fields,* *Must Be* Cultivated

EVERY time an appliance is sold, load is added to a utility's lines. The more appliances, the more load. Thus, utilities have sales promotional programs—including advertising, personal selling, dealer cooperation and the like—to sell more appliances. How does this affect you as a member of the electrical industry?

¶ Just this way. If the utilities do not add load to their lines they will not grow. The faster the growth, the more money spent on advertising and other promotional work, on new equipment and new construction.

¶ If utilities are forced to withdraw from or reduce load-building work, growth will be slow at best. If utilities grow slowly or not at all, equipment purchases are curtailed. Manufacturers cannot prosper with this reduced market—so they, too, naturally curtail their activities.

¶ In nearly every case, power companies have concentrated on the larger load-building appliances. These mean bigger load and faster growth . . . but they are not so well accepted as the smaller appliances. So they need more advertising, pushing, promoting to get acceptance. Dealers and contractors are not in a position to do a complete advertising job at present. Manufacturers and wholesalers cannot replace the utility advertising that is developing the electrical market in every town—however small. Who, then, if the utilities are not allowed to help with sales promotion, is going to build load?—and indirectly build the whole industry?

¶ Moreover, as a utility grows it spends more money fostering local business. Each time a utility buys from a local firm, it means a greater potential market for the industry's goods. Stop growth and progress stops; community purchasing power is reduced; industry expansion halts. Stop growth and your future in the industry is jeopardized.

¶ This is nothing but sound reasoning. Your success, which means the welfare of your family and your business, is linked inevitably with the success of the utilities. Think it over.

San Joaquin Light & Power Corporation

Get the Facts

IF you have read this far, you have a fair idea of what problems face the utilities today—and how these problems affect you. You have a picture of where the utilities stand, and what they want to do about it. Private power companies are not individualists . . . or foreign entities which have no interest in the industry or community. They are integral parts of the territories they serve. They cannot prosper when mines, farms and industries languish. Their conditions will improve only when commodity prices are increased—when men go back to work.

¶ And you, as a member of the electrical industry, will not prosper if the utilities are cudgeled and oppressed—if they are forced to devote their resources and time to protecting themselves, and are unable to turn to the constructive job of pushing ahead. Only if they push ahead will they be able to buy your products and services—or help you sell them.

¶ You can help the power companies—and yourself—by learning and remembering the facts. Be ready to tell the truth to your neighbor. If you are uncertain about some point, ask your power company. It will take only a minute . . . but it will be time well spent, because then you will be able to defend your industry against attacks. By righting your neighbor, giving him the correct story, you will not only be helping the utilities and your personal friends in and out of the industry—you will be helping yourself. Helping yourself back to prosperity. You have invested a lot of time and money in the electrical industry. Get The Facts—and protect your investment.

Northwest Electric Light and Power Association

707 Spalding Bldg., Portland, Ore.

Competition will get 'em ef you don't watch out....

AS fuel sales activities increase in your territory, are you holding all of your electric range customers? Are you sure they are satisfied with electric cookery?—that they won't switch to some other fuel tomorrow? . . . or next week?

There's no use kidding ourselves about fuel competition. It's here. And it has one big talking point—*speed*. Every competitive fuel salesman talks *speed* to your old customers because he knows, just as we all know, that you can't get 1933 speed from a 1928 range unit.

More than 175,000 electric ranges in the West are five or more years old . . . 175,000 hot prospects for other fuels. Are you going to sit idly by while your competitors reap a harvest?

Many of these 175,000 can't afford a new electric range . . . but they will buy something. Once your competitors' salesman get to them, there will be 175,000 customers dissatisfied with slow, out-of-date electric ranges.

How are you going to save your range load?

Don't take a chance with your success . . . make sure that you save that load by starting a campaign on Chromalox *Super-Speed* Replacement Range Units. Make those old ranges as fast as the latest 1933 model. Plenty of companies are recommending and using Chromalox units for replacing inefficient, obsolete and burned-out elements. They've found that a real Chromalox modernizing campaign will:—

1. Save the range load
2. Protect capital investment
3. Make satisfied range users
4. Build load by increasing use
5. Make new range sales easier

No large stock investment is needed . . . no wiring and trade-in problems. It's a sure-fire selling job. Try it out for yourself on your own range or on the range of some other official of your company. What size Chromalox *Super-Speed* Unit shall we ship for the test?

GET YOUR COPY of this TRIED and TESTED PLAN

MAIL THIS COUPON WITH YOUR LETTERHEAD
To Nearest Direct Factory Representative

THE ELECTRIC MATERIAL CO., Inc.
912 E. Third St., Los Angeles, Calif.
163 Second St., San Francisco, Calif.

MONTGOMERY BROTHERS
911 Western Ave., Seattle; 308 Pine St., Portland

The PETERSON CO., 1921 Blake St., Denver, Colo.

Or to EDWIN L. WIEGAND CO.
Manufacturers of Chromalox Heating Units
7540 Thomas Boulevard, Pittsburgh, Pa.

Without obligation, please send us complete data about Chromalox Super-Speed Range Units including ( ) Elec. Testing Laboratories Boiling Speed and Efficiency Report, ( ) Sales Helps, Window Display, ( ) Prices, Quantity Discounts.

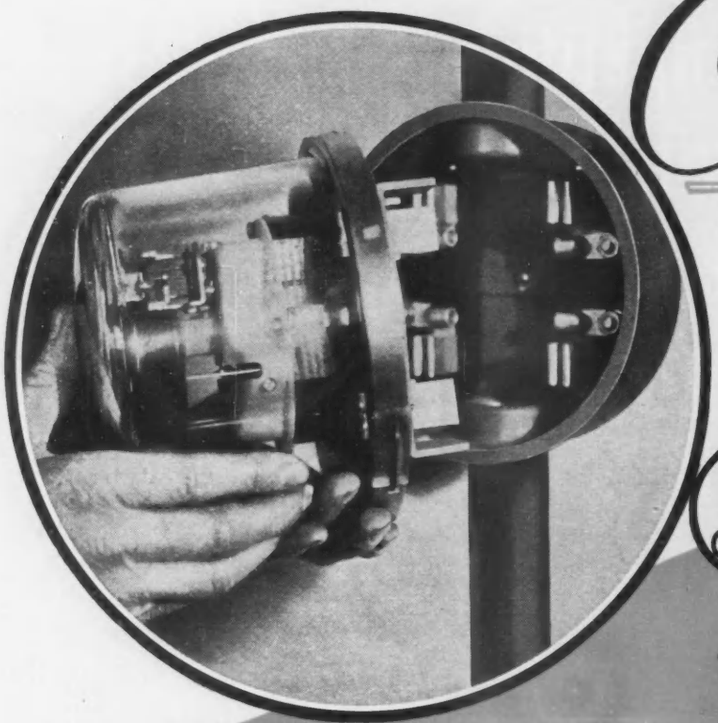
Also ship us for 10 days' FREE examination and test the following units. We agree to return these units, postpaid, in 10 days; otherwise charge them to my account less 30% discount. *Be sure to specify model and make of range.*

☐ 1000-watt units to fit.....
☐ 1200-watt units to fit.....
☐ 1500-watt units to fit.....
☐ 2000-watt units to fit.....

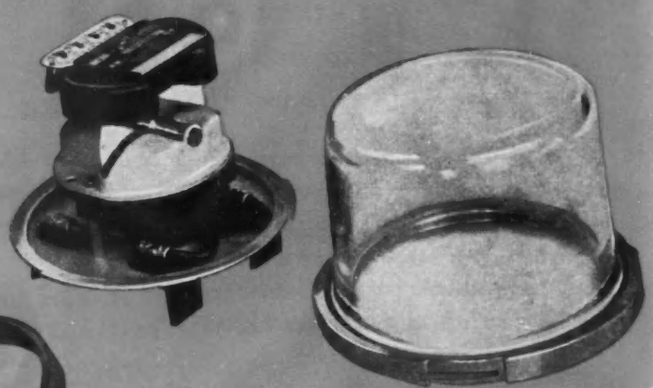
Signed .....

Position .....

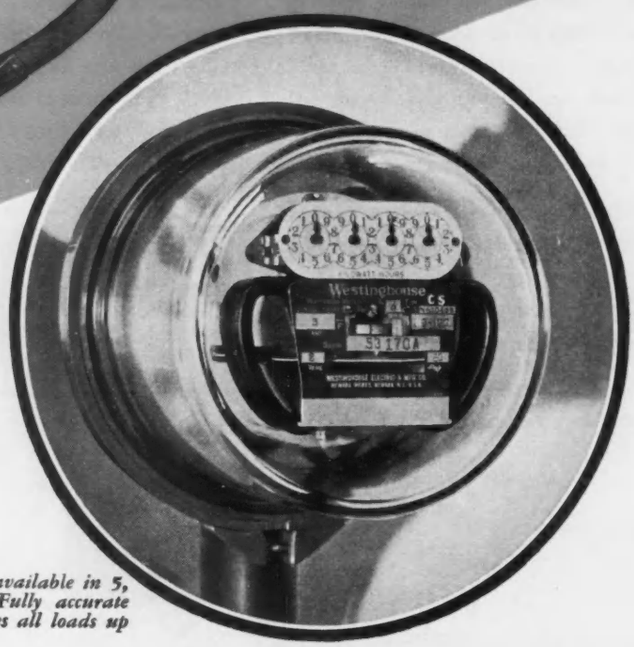
Change



Old meters can be changed to detachables at low cost with CS armor-mounting parts.



Only four new parts are required for armor-mounting. Left to right: Type S Socket, CS Sealing Ring, Base Plate (on which element is mounted) and Glass Cover.



The new CS Detachable Meter, available in 5, 15, and 50-ampere capacities. Fully accurate up to 300% of rating, it measures all loads up to 150 amperes.

your old Meters

to

DETACHABLES

with the New CS Armor-Mounting

BY simply applying the new CS armor-mounting parts to an old meter element you can make it a weather-proof, detachable meter with all the resulting advantages. The most important of these are:

1 Armor mounting prevents energy diversion.

2 Can be installed outdoors where it saves time in reading and testing, permits regular billing, and lessens probability of tampering.

3 "Dead front" testing with only a test jack eliminates the need for permanently-installed test facilities.

4 Saves time in meter setting and removal because it plugs in and pulls out like a radio tube.

5 Saves space in multiple dwellings where meters are grouped.

Only four parts are required for the change: (1) A base plate on which the meter element is mounted, (2) a glass cover, (3) a sealing ring and (4) the type S universal meter socket.

The base plate and socket are six inches in diameter, large enough for practically all old meters since the top-connected type OA. Both socket and base plate are equipped with knife-blade contacts of 50-ampere rating which will carry loads up to 150 amperes continuously. Thus they are suitable for the 50-ampere OC and CS meters which are accurate up to 150 amperes. All lower ratings, of course, are adequately served.

Westinghouse

Quality workmanship guarantees every Westinghouse product

The type S universal meter socket is a die-casting of non-corrosive alloy with ample room for wiring with No. 2 cable.

The sealing ring is equipped with an improved tightening device that draws the glass cover and base plate into firm contact with the socket so that only one gasket is required, and the cover need not be sealed to the base plate. This facilitates load adjustments during "in place" testing.

You should investigate the armor-mounting of your old meters now, because:

1 Substantial savings result from lowered energy diversion and the elimination of missed readings.

2 It permits the use of present meter stocks in adopting the new metering system.

3 Present large stocks of idle meters make this the ideal time to do your remounting.

4 The cost is low. Those power companies that wish to do their own recalibrating can obtain special prices for remounting by Westinghouse without testing included.

SEND FOR INFORMATION

Westinghouse Electric & Manufacturing Company,
Room 2-N—East Pittsburgh, Pa.

Gentlemen: Please comply with the requests that I have checked.

- ☐ Have an engineer call to discuss the savings possible from the use of the new Metering System.
- ☐ Furnish prices on the remounting of old Westinghouse OA and OB meters for detachable service.
- ☐ Send information on the new CS meter.
- ☐ Send information on the new metering system.

Name.....

Company.....

Address.....T 79525

City.....*State*.....EW 5-13-33

An Outstanding
CIRCUIT BREAKER

For Tamper-proof Fuseless Protection of Building and Industrial Circuits

IN THIS new circuit breaker, G-E designers have employed a unique principle of circuit interruption. Result: *no external arc.* The contacts are in a closed chamber, which effectively confines the arc when the breaker opens. Thus confined, the arc is broken under pressure, which results in remarkably high speed of interruption—.008 of a second. It is absolutely quiet except for the click of the mechanism.

The performance is further aided by a quick make-and-break contact mechanism.

Application

In panelboards and other load centers, instead of fuses and fused switches; in service entrances, instead of fused switches; in dead-front switchboard assemblies; and for individual circuits and appliances.

Advantages

This circuit breaker prevents over-fusing and "bridging." The tripping (thermal overload) element is sealed and can not be tampered with.

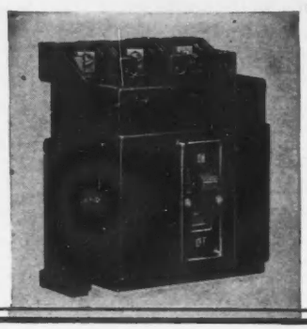
It makes possible prompt restoration of service; no need to spend time locating blown and spare fuses. The target shows which breaker has opened. Power is restored by simply moving the handle.

It assures safety. When properly installed, there are no live parts exposed. There is no external arc during circuit interruption.

Ratings

Up to 600 volts, alternating current, and 250 volts, direct current; 15 to 600 amperes; single-, double-, and triple-pole.

Mail the coupon to the nearest G-E Office or to General Electric, Dept. 6E-201, Schenectady, N. Y.



Triple Pole

General Electric, Dept. 6E-201, Schenectady, N. Y.

☐ I should like to know more about the AF-1.

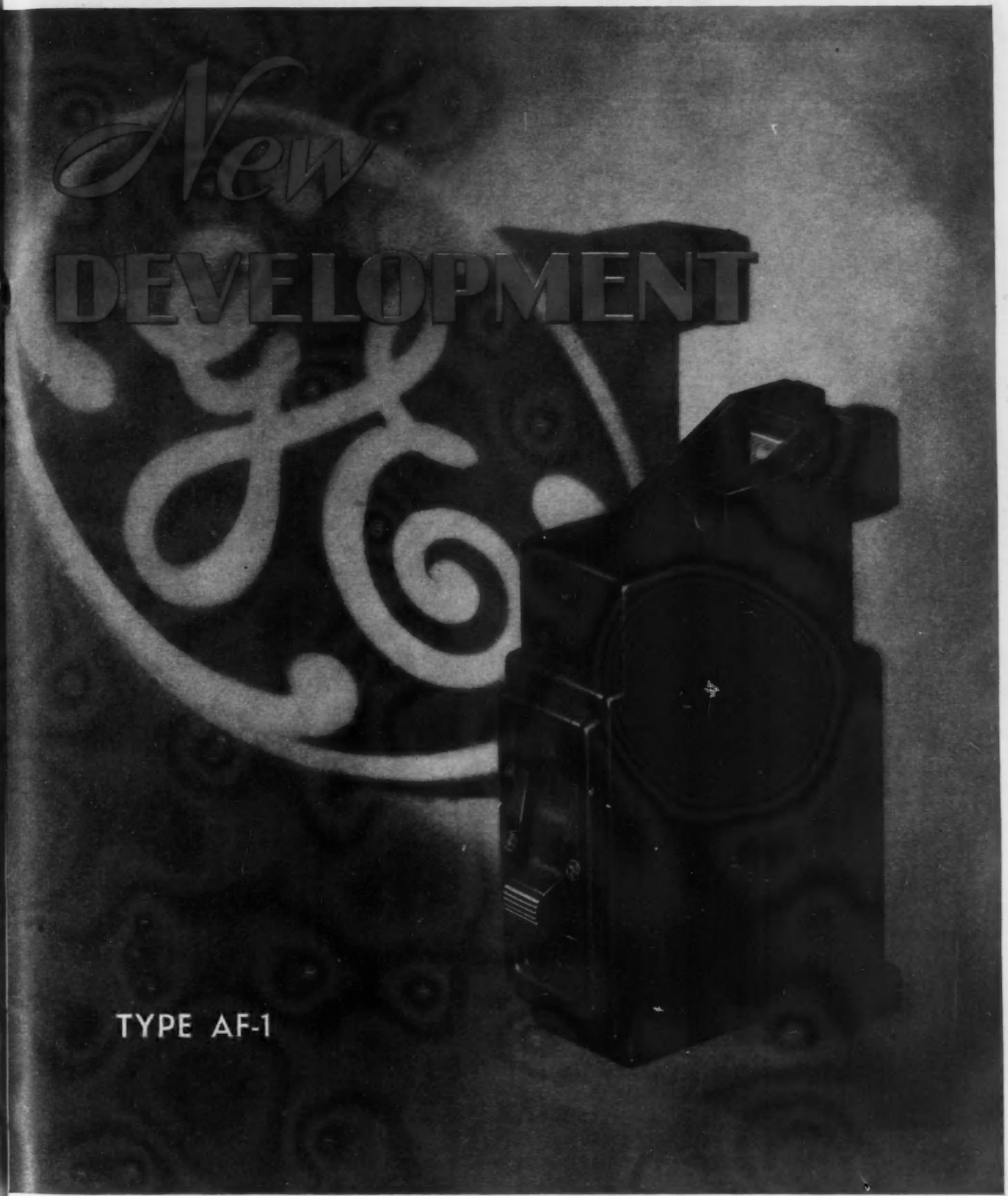
☐ I should like to see a sample.

Name.....

Company.....

Address.....

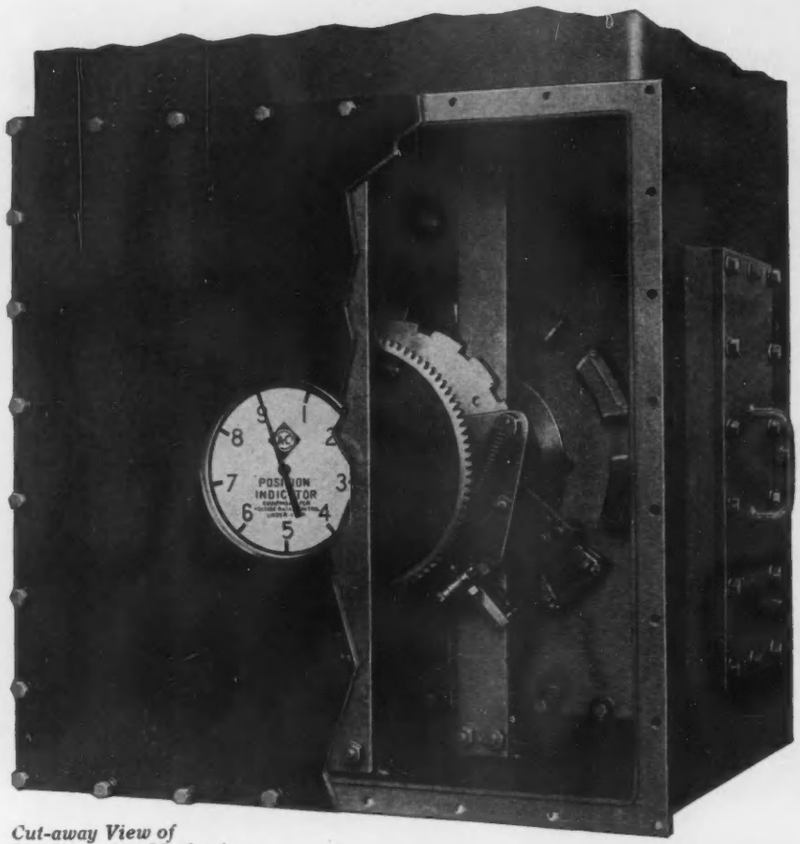
490-15



Illustrations (above and on preceding page) show single-pole and triple-pole breakers, 15- to 50-amp. size; height of each is 6 inches

GENERAL ELECTRIC

A New Automatic Feeder Regulator



Cut-away View of Tap Changing Mechanism

Automatically controlled to regulate voltage on small capacity feeders of any circuit voltage.

◆ ◆ ◆

The new Allis-Chalmers Type AFR Automatic Feeder Regulator meets a long felt need for more economical and more efficient regulation of small capacity feeders. The Type AFR regulator can be furnished for single-phase or three-phase operation, indoor or outdoor, and for any voltage.

◆ ◆ ◆

SOME EXCLUSIVE FEATURES

1. Low first cost, particularly for outdoor applications and the higher distribution voltages.
2. Low installation cost. Current and potential transformers are built into the unit and do not require separate mounting. There is a self-contained source of motor power. Power for the operating motor and voltage for the primary relay are obtained from an auxiliary transformer built into the equipment. The unit may be shipped in oil.
3. Low core and copper losses. Since transformers are used the losses are comparable with losses of distribution transformers of equivalent kva. parts.
4. Low exciting current. Since transformers are used the exciting currents are comparable with those of distribution transformers of equivalent kva. parts.
5. Quiet operation. No more noise than from a distribution transformer of equivalent rating. The tap changing mechanism is almost silent in its operation.
6. Roof-type bushings, or wiping sleeves for cable entrance.
7. Insulation co-ordinated with the bushings. . . . *Ask for Bulletin 3021.*

Other Allis-Chalmers Products

Electrical Machinery
Motors - Generators
Switchgear - Transformers
Mercury Arc Power Rectifiers
Railway Electrification Equipment
Generator Voltage Regulators
Steam Turbines
Steam, Gas and Oil Engines
Condensers
Hydraulic Turbines
Centrifugal Pumps
Compressors and Blowers
Texrope Drives
Industrial & Track-type Tractors

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee

PACIFIC COAST OFFICES:
Rialto Building, San Francisco, Calif. 1117 Rowan Building, Los Angeles, Calif. 1623 Smith Tower, Seattle, Wash. 354 Belmont Street, Portland, Ore. 222 Continental Oil Building, Denver, Colo. 421 Kearns Building, Salt Lake City, Utah

EXECUTIVES
AS WELL AS
ENGINEERS
ARE READING THIS BOOK

YOUR COPY IS READY

CORNING GLASS WORKS
CORNING • NEW YORK

Name_____

Company_____

Address_____

PYREX SUSPENSION AND STRAIN INSULATORS

Western Representatives:

San Francisco—Los Angeles
W. W. Kirk

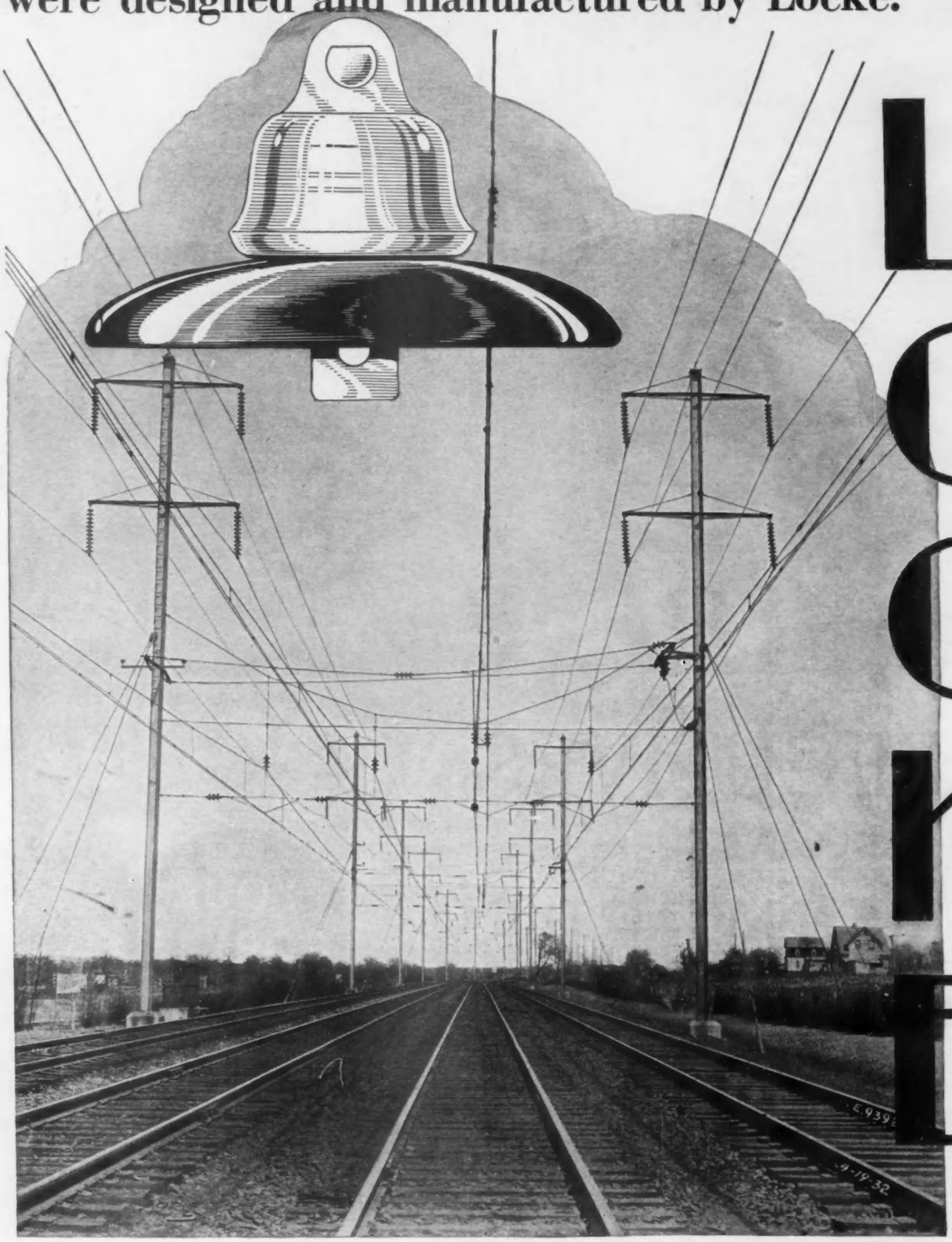
Seattle
T. S. Wood

Phoenix
J. E. Redmond

Denver
J. Q. Lalor

Salt Lake City
The Galigher Co.

The majority of the insulators used on railroad electrifications in this country were designed and manufactured by Locke.



LOCKE

A section of the newly electrified main line of the Pennsylvania Railroad.

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ELECTRICAL WEST

With which is consolidated the Journal of Electricity
McGraw-Hill Company of California

Volume 70 | San Francisco, June, 1933 | Number 6

The CONVENTION *in Print*

STIMULATION of progress, reawakening of courage and focusing of attention upon major problems are functions which have been performed successfuly by the annual Pacific Coast conventions of the electric light and power industry in past years. Because economic necessity has forced the abandonment of these conventions in 1933, ELECTRICAL WEST has undertaken to provide a practical substitute in the form of a "Convention in Print."

Supported enthusiastically by all branches of the industry, the plan has the endorsement of the executive committee of the Pacific Coast Electrical Association and the Northwest Electric Light and Power Association. Executives and leaders throughout the industry have cooperated in the fullest measure to make this unique convention a success.

Basically, the program embraces all and more than the customary conventions of past years. First, there is a manufacturers' exhibit—new to these territorial conventions—comprised of the advertising pages of this issue. Next is a general session in which the association presidents rally the industry for immediate action. A group of courage-inspiring, morale-stimulating messages from chief executives show the high quality of today's leadership. Utility management's present and future responsibilities are outlined. Regulation's state of flux is discussed from diverse points of view. Manufacturer, wholesaler, contractor and inspector define their relationship to the whole industry in the light of present conditions. Advertising is placed under the microscope.

Then there are real round-table discussions which take the place of the usual section meetings. In these, experts freely express opinions on subjects of particular moment to the industry. Commercial men present widely-differing, even controversial, views on such subjects as merchandising and load building, competitive power, modernization of home wiring and lighting. Engineers and operating men frankly voice opinions on the economics of system modernization, define adequate maintenance, discuss the applicability of the new meter sequence and argue the advantages of radial or primary network distribution. Here are real people discussing real problems.

When you opened this magazine, you registered for the "Convention in Print." As you turn this page, the convention is in session.

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The Time Has Come for Action

The Address of

R. E. Fisher

President, Pacific Coast Electrical Association

THE electrical industry is composed entirely of human beings. Instead of diabolical Legrees whose reason for existence is to make "unconscionable demands" of the public, instead of deceptive, subversive personages without emotions, as some have pictured us, we turn out to be humans after all. I am afraid that is a sore disappointment to our maligners. But I am not at all certain that it is not the trouble with the electrical industry today. Perhaps we have been too human.

Do not mistake my meaning. Humanness is a virtue, and every industry, including the electrical, should strive to be more human and more personal in its relationship with the public. Yet the electrical industry has been so human as to forgive persistent attacks and excuse oppressive impositions. It has had the human faith to believe that fellow humans would see the righteousness of the industry's stand, and that passive prayer somehow would pierce the veil of misunderstanding. It is a sad truth that this course has not been successful, so we must change the course. The time has come for action!

It is unfortunate that no convention of the Pacific Coast Electrical Association is being held this year, but we are fortunate indeed that ELECTRICAL WEST offers the "Convention in Print" as a substitute. For the electrical industy in this section needs a meeting, even if it is in print—a medium whereby the call may be given to the industry to mobilize as a unit for the battle ahead.

This is no time for each of us to hibernate, to sit by himself and think local, individual thoughts. We need collective thinking, all-industry thinking—a magnanimous sort of thinking in which every one of us remembers that the electrical industry is composed of interdependent branches, and that each branch is composed of interdependent units. If harm comes to any single unit, the others suffer in some degree. And if any unit allows itself the slightest bit of tarnish, all the others are damned alike with suspicion, doubt and question.

But just thinking collectively is not sufficient; we must act collectively. The industry needs definite action, forward action, courageous action. It needs, most of all, a militant spirit, a fighting determination to protect from insidious legislative attack that which has been built by private initiative and private capital over a period of years, and to protect from economic attack the load that has been added by honest sweat and trustworthy representation. There is where the battle lies. It will take work, hard work, to win, for our only weapons must be facts.

I know of few alarmists in the electrical industry. The prevailing atmosphere of faith, courage and initiative simply is not conducive to their health and multiplication. But we must not fool ourselves; the problems facing the utilities directly—and the rest of the industry indirectly—are alarming enough to cause grave concern. Fortunately, some of the utilities are comparatively well off; but viewed as a whole, the situation is not a pretty one. Fertile legislators conceive tax bills with what seems utter abandon, in the hope of squeezing from already tax-burdened power companies the moneys necessary to run governments which have not reduced expenditures in a business-like way. Further rate reductions are sought by cities and groups, even by law, although rates now are lower than the general level of prices and the return to the utilities is only slightly more than enough to afford a hand-to-mouth existence. In some cases, as a matter of fact, the utilities are losing money already.

A few of these bills, though not all of them, are smoke screens behind which their authors hide. Some definitely are unconstitutional for one reason or another; some probably never were intended to be passed. Realize, however, that the chief asset of a public utility is good will, and that the bill-mongers know it. Realize, too, that every time a utility is forced to protect itself from a confiscatory measure by recourse to the courts, good will takes a drop. Thus, gradually but surely, these political saboteurs, by tyrannical means, are covering the utilities with the mantle of the tyrant; and through oppression, they are obscuring the fact that it is the utilities which are oppressed. This must be stopped.

The public never would be taken in by this guff if it knew the facts. If consumers understood that rates are not fixed arbitrarily, but are determined by the cost of service divided by the number of kilowatt-hours sold, they would see the fairness of the present rate schedules. If they knew that the price of electricity is lower by far than other prices, the cries of "high" rates would be stifled. If they knew that every cent paid in taxes must be added to the cost of service, and that, largely speaking, rates cannot come down when taxes go up, they would see to it that proposed tax increases were defeated so that rate reductions would be possible. The public prefers rate reductions because they are tangible, whereas taxes are not. The utilities prefer rate reductions, whenever possible, because the benefits of electricity are made available to more people, and present consumers will use more electricity. Rate reductions enlarge the market of the manufacturer, wholesaler, contractor and dealer, too.

So we must give the public the facts! And the simplest, surest method is to start with the industry, itself. Every employee must be told the true utility story in simple words and phrases, so that the simple words and phrases may be used in turn by these employees in convincing the public. This type of education best begins at home. The correlation of the facts and the teaching of them is an all-industry responsibility; agreement upon the proper medium or media that shall be used for the teaching calls for leadership within the industry.

The full development of the many phases of the legis-

lative attack cannot be undertaken here because of space limitations. We must turn to a closer problem, the economic attack. The business which a utility now has, the load which it now serves, must be retained if that utility is to continue to operate, if the electrical manufacturers, wholesalers, contractors and dealers are to find outlets for their goods and services. Domestic load, to a great extent, has been increased, despite the trend toward consolidation of two or more families under one roof. Selling did that; promotion did that. Through years of effort, we have sold the residential public on the benefits of electricity in the home; the housewife today would not think of being without electric light and certain electric appliances which lighten her work, give her more leisure and improve the quality of her product, whether it be cooking or housekeeping. Without lessening our efforts in the domestic field, we must become more aggressive to save the other classes of load.

Competitive power must be kept from securing industrial plants and commercial establishments from electric lines. I realize that in some cases this will be difficult because of immediate cost considerations, but electricity has so many advantages over other fuels for most uses that first-cost alibis should not defeat good salesmen. We must continue to sell on the basis of improved quality of the product, even as we have in the home. Repeat it and repeat it; repetition eventually will have the desired effect. We have discovered and tabulated the advantages of electrification in each field, but there are advantages which still are undiscovered, still unlisted. Instead of five or six, we need ten or twelve superiorities to talk about if we intend to overwhelm competition today. Well, then, let's get them and use them.

Municipal ownership agitation grows in times like these and threatens to take from our lines vast blocks of load. The problem is more acute in some sections than in others, but it is an eczema that may spread to all sections if given a chance. Every man in the industry must lend his hand in stamping out the rash while it still is comparatively localized. We must show it to be the ivy that threatens the oak; we must show it to be city-bred and selfish. It is common knowledge that agricultural load is more costly to serve than urban load, but municipal ownership aims at the urban load and lets the farmers suffer under the burden of paying for electric service on the basis of cost. This not only is selfish, but it is unwise and shortsighted, because cities depend on their hinterlands—the farmers, in this section—and if the farmers must pay higher rates and realize smaller profits from their work, they will be unable to support the cities as fully as they might otherwise. The merchants lose in business and increased taxes, since municipal utilities are exempt from levies which private utilities pay, more than they might, but seldom do, save in rates.

Few other businesses could survive the competitive disadvantages that private utilities labor under, when competing municipally-owned utilities are exempt from taxes and immune to regulation. We are not fearful of competition if it is fair, but the discriminatory benefits accruing from freedom from taxes and utter lack of restraint or control amount to a subsidy that neither the public nor the utilities can in fairness or justice continue to shoulder. We have not talked loudly enough about the public's interest in the exact nature of this subsidy. Taxed at the 7.5 per cent state rate applied to private companies, and excluding Federal and franchise taxes, municipal utilities last year would have contributed $1,902,816 to the cost of government in California. It is to the credit of management and

R. E. FISHER

operating efficiency that rates of private companies are as low as those of their municipal competitors, despite the two major disadvantages.

Yet, no matter how hard we work, some load probably will be lost. To offset this, new fields must be explored and opened, new selling must be developed, new outlets for utility service must be found.

These, sketchily, are the problems which face us in 1933. They encompass the selling of the utilities themselves as much as the selling of appliances or electricity. We must face them directly and solve them by direct action. The whole industry must work together toward this goal. And because the whole industry must work as one, I offer this suggestion:

The Pacific Coast Electrical Association now stands by itself, divorced of any national affiliation. In the past it has been primarily a power company organization in which the other branches of the industry found representation. Since we are starting afresh, since we soon must determine our future policies, I suggest that the Pacific Coast Electrical Association be just what its name implies: an all-inclusive, all-industry organization embracing every branch. Instead of having cooperation between separate associations, let us have closer cooperation within the one.

We of the Association must be more militant from now on. We must fight harder to protect our past work and our futures. But no matter what we do, we must be guided by safe and sane policies. These policies, enunciated some years ago, will bear repeating; I commend them to you. First, the policy of service, with an attitude of friendly helpfulness toward the public. Second, the policy of frankness, to ourselves and to the public. Suspicion feeds upon concealment; the facts of the utilities' case are a credit to the industry in this section, and a frank disclosure of them will do as much as anything else to allay suspicion and cement the good will of the public. Third, the policy of repelling slanders, of calling a lie a lie. Management has an obligation to protect the public from deception through unfounded charges.

Of the industry as a whole, I ask just one thing, but it will do much to solve the problems facing us. Forget for the moment that you are John Jones, of the XYZ Company; you are John Jones of the Electrical Industry. Your immediate task is to do your work in a fuller, more efficient manner than it has been done before, but you have a secondary task of helping your industry to a place of security, of defending your industry from pernicious attacks, of building your industry until your job grows bigger, too. The time has come for action.

STAY With It and FIGHT For It

The Address of

J. E. E. Royer

President, Northwest Electric Light and Power Association

I AM pleased at the opportunity offered by ELECTRICAL WEST for addressing the members of the Northwest Electric Light and Power Association as if we were assembled in a convention hall. In extending a greeting to the members of the association, I wish also to welcome as visitors those other readers of ELECTRICAL WEST who pause to peruse my remarks and the various convention reports.

The absence of a general convention toward the close of the association year is not new in this territory. We have not held an actual convention since 1929, but have contented ourselves with the publication of the committee reports and a resumè or summary by the president.

In many respects the past year has been one of the most strenuous and interesting years in the business careers of most of us in the industry. The trying business conditions generally existing since the beginning of 1930 have grown progressively more serious. The major problem of operating successfully on continually-decreasing revenues has been intensified. How may the diverse interests of our investors, our customers and our employees be brought into economic balance? seems to me to state the general problem broadly; included in this general problem, of course, are the multiplicity of related problems of cutting operating expenses, saving existing business, getting new business, collecting for the business actually transacted and, finally, the problem of financing in the face of equal or increased fixed charges and generally increasing taxation.

Let us turn, for a few moments, from the consideration of the present, and contemplate our background, like the traveler who pauses at a rise in the trail to review his progress and to plan the route ahead.

A quarter of a century has elapsed since the birth of the Northwest Electric Light and Power Association —since that day in September, 1908, when a small group of public utility operators banded together for the threefold purpose of extending service, improving service and lowering rates—a purpose that continues to be our ideal.

Twenty-five years is a long time in the life of a trade association, and this interval has been replete with many important developments and filled with achievements of which we all may be proud.

But time flies—and all is change. Consider what changes have taken place in the social and economic life of the people living in the territory our member companies are engaged in serving. Twenty-five years ago this northwest region was not far removed from the pioneer stages of its development. Settlers still were breaking ground in regions which since have become prosperous farming communities. Our towns, aspiring to become cities, at that time were hardly more than trade centers, born of the necessity for intermediary points between the farms, forests and mines and the markets of the world. Our industry—the electric light and power industry—was a fledgling trying its wings, and our horizon was surely not a wide one.

The wonder of today is the common place of tomorrow. The romantic aura which surrounded our earlier endeavors has been largely dispelled—the vast contributions which our industry has made now are taken for granted, and the savage attacks to which our political antagonists now subject us lend verity to the proverb that "familiarity breeds contempt."

In those earlier years we had need for help in the solution of our many problems, and we found that help in the assistance available to us through our affiliation with the National Electric Light Association. Although that group has withdrawn from the trade association field and the Edison Electric Institute has taken its place and will carry out policies national in scope and will operate to the benefit of the industry as a whole, new responsibilities have devolved upon our own Northwest Association because it is now a separate entity.

This transition should focus our attention upon the situation in which we find ourselves and should encourage the development of a new program for the future in which we shall be acting entirely on our own.

During the last few years many changes have taken place in the social and economic life of our Pacific Northwest, as well as in that of the entire nation. Important as these changes have been, they cannot compare in magnitude or diversity with those which are to be a part of the future. We are standing on the threshold of a new era, and if we are to continue to function and to play a worthy part in the future history of this region, it behooves us to take stock of things as they are and to make every effort to foresee what lies ahead of us so that we can make appropriate plans.

The earlier stages of the development of our industry called for the genius of the engineer, and our earlier efforts were directed towards the solution of problems of generation and transmission of electricity. In this the Northwest Electric Light and Power Association, with its various technical committees, played an important part through the interchange of ideas. Later, the financial aspects of the industry assumed a larger importance, and the matter of sales began to occupy our attention.

While these phases of the industry still occupy important places in the scheme of things, we are now faced with new problems which were unknown 25 years ago. We find ourselves assailed by individuals and groups of individuals, all impelled by political expediency, seeking, in one way or another, to dominate the industry. We find that, after years of effort and expenditure of millions of dollars toward the construc-

tion of efficient light and power systems, we are faced with the danger of being "muscled" out of existence by political racketeers and their cliques.

The leaders in these movements are proposing vast publicly-owned and politically-operated power enterprises which are entirely unfeasible from an economic angle. We have nothing to fear in the way of competition from projects that are based on the same rules by which we are forced to operate. But we cannot hope to compete with projects conceived by the union of ballyhoo and political intrigue and fattened at the trough of the public treasury, to which we are forced to contribute huge sums in the form of taxes. Such a condition violates the American spirit of fair play.

These are indeed trying times, and the public, distracted by reverses and baffled by a maze of conflicting economic theories, easily may become the prey of political opportunists who would have us adopt principles entirely at variance with our American theory. Let us not be deceived by a communistic Trojan horse masquerading under the title of "unemployment relief" or "development of God-given resources." Until the law of arithmetic is suspended and two and two no longer make four, such schemes are doomed from the outset—to carry them out would only engender chaos and we should deserve the ridicule of posterity. Projects that are economically sound can be developed most efficiently by private initiative, and private ownership and operation; projects that are not economically sound are not worthy of the consideration of intelligent people, otherwise we shall see our sustenance wasted in vast monuments exposed to the ravages of all-consuming time. We have a responsibility to the public in this matter; it is our duty to offer our knowledge and counsel to the service of the public.

If the Northwest is now turning from an agricultural to an industrial era, then we must attract the population necessary to such development. Industry seeks population. Population is marching westward, and industry, belatedly following Horace Greeley's advice, is coming west also. We are prepared for industry, ready to furnish low-cost power from widespread electric service systems admirably suited to the new industrial era. Electric service, flexible, available at many places, enables industry to expand beyond the confines of any one particular location, resulting in better health, greater contentment and greater efficiency for the workers.

It is a recognized fact that during the last decade or so the electric service industry has increased its facilities for service beyond the normal demands of the region which it serves. This was the application of sound business principles, predicated upon steadily increasing demands. An unparalleled depression, however, has widened the gap between the amount of power we thus have made available and the amount which is being used. The significance of our present situation is apparent when we consider that along with this idle generating equipment go large investments in transmission, substation and distribution equipment, now used only to part capacity. All this idle plant represents an investment that today is not earning an adequate return, but is piling up fixed charges which must be met. This undoubtedly is now, and will for some time continue to be, a major factor contributing to our inability to absorb further taxes or reduce rates, and tends to complicate even further the major economic problems of the industry.

J. E. E. ROYER

The Northwest Electric Light & Power Association can and should turn its attention to these new problems. In the past it has assisted in integrating the various member companies to secure greater efficiency in operation and service. It should now point out these achievements to the public and foster the conclusion that the private utilities of the Northwest stand ready to do all in their power toward the sane development of the region and its resources.

The committee reports for the convention, appearing in this issue, deserve your serious consideration. I want to take this opportunity to thank the officers of the association for their support and to assure the section chairmen and their committee chairmen that their efforts have been of great value to the member companies this year and are gratefully appreciated.

A going concern value, in the language of the industry, has been established by the Northwest Association over the 25-year period of its existence, and we all desire that this value be perpetuated. We may confidently expect to meet again in section meetings, in general conventions or through conventions in print, so let me close by again thanking all our association workers for the interest they have shown and let me say that it has been a distinct pleasure for me to serve as your president in these trying, but exciting and interesting times.

"To the Rank and File

of our thousands of employees, I want to make a special plea. Do not lose faith in your chosen work. Do not be misled in your belief in yourselves and in your colleagues by the recriminations born of conditions which have distressed the public at large. Do not allow the mistakes of a few to be charged indiscriminately against the entire industry. Retain your faith in the fact that we are an essential industry, honestly conducted. Legitimate business conscientiously conducted for honest profit in the long run will endure and pay just rewards. You are in that sort of business; stay with it and fight for it."

BY PROXY

Casting Their Ballots for Public Enlightenment

Public Opinion— The Greatest Problem

By HARRY J. BAUER
Chairman, Southern California Edison Co., Ltd.

AS WE examine the perplexing questions confronting the managers of electrical utilities, we note a dizzy array of problems to be solved before we again can concentrate our energies on the technical advancement of our business leading to a constantly-improving service to the public. Some of these problems are new; many of them are old; all of them have been intensified by the economic stress of these times.

There is the problem of taxes with its many ramifications leading into labyrinths of governmental economy; rate structures and regulation; discrimination between consumers of private and municipal utilities; the maintenance of earnings which will attract new capital when needed; wages and employment—all of these and many other matters of great moment are interlocked with the problem of taxes.

There is the problem of rates, frequently discussed with an utter disregard for taxes; the unqualified demand that rates be reduced for no other reason than that people think they are too high; the adjustment of rates to meet competing mediums; the relation of rates to the general economics of the community; the function of rates in promoting new business and generally making available new devices and appliances; these are the problems of the manager who seeks to improve his balance sheet.

There is the problem of long-range planning, more essential to this than to any other industry, to anticipate the growth of territory; to meet all demands as they appear; to build adequately without overbuilding; to diversify the load against industrial fluctuations; to maintain a flexible financial policy and escape high interest charges; to avoid expensive obsolescence; such are the problems if the utility's securities are to enjoy high ratings in the open market.

There are problems of harmonious organization; of obtaining and retaining a skilled personnel, loyal, efficient and understanding the vital part they play in the utility's affairs; of humanitarian measures to promote their welfare and make their future secure; of intelligent training to fill inevitable vacancies; of preparation to meet emergencies of every conceivable nature.

The foregoing are answers which would be brought forth if one should ask the question, "What are the problems of the electric utility?" To be sure, these are some of our problems, serious indeed, but none of them is our greatest problem.

The greatest problem of our industry is to keep in line with public opinion, so far as that is possible. When, from our intimate knowledge of this business, we find public opinion illogical and counter to the best interests of the community, we then must bring public opinion into line with us through a policy of utmost candor, explaining in detail the factors which justify our position and which long experience has proved to be sound; factors entirely obvious to us but mysterious to those outsiders whose combined thought composes that intangible thing called public opinion.

This one problem embraces all the others we have mentioned. There would be justice in taxation if the public was thoroughly informed. Rates would not please everyone, but the element of bitterness would be removed. Policies which now irritate would be accepted as reasonable if the public understood the underlying causes. The new situation would not be Utopia, but it would be humanly comfortable.

An occasional genius can defy public opinion and succeed, but these are found chiefly in the field of art; there is no room for them in our business. Ours is a public utility; it is clothed with a public interest; and, it must be conceded, it is at the mercy of the public. Ignore the public and the road will be thorny.

How can this greatest of our problems be solved? It is easy to state what should be done, but it is difficult to select the best medium for doing it. Somehow or other, we must bring about a partnership of confidence. This is a simple matter between two individuals, for example, yourself and your tailor. It is not easy when the two parties are a large corporation on the one hand and a group of two or three million people of varied interests and experiences on the other. The man of small affairs simply cannot comprehend the corporation and its practices. And the utility's managers, through years of association with involved technical and financial matters, do not always realize how mysterious these matters are to a man lacking similar experience.

We must know that it is as hard for the workingman to understand public utility economics as it is for the baseball fan to understand cricket. Yet, somehow, this understanding of our business must be brought about. It is a dull, dry, uninteresting subject, involving such features as rate-base, regulated monopoly, depreciation, capital expenditures and operating expenses, fair rate of return, taxes, cost of service, cost of money, theory of rates and the like. There is seldom a misunderstanding with a consumer which is not founded on one of these features. We can deal with his complaint when it develops, but what can we do to anticipate the complaint and make it unnecessary?

Anyone of us trained in the industry can sit down with an outsider and, in the course of a pleasant conversation, discuss these things to the point where he will say, "That's fair enough. The trouble was that I have never had it explained to me."

But there are not enough of us to have such individual conversations with our millions of consumers. Even if every utility employe were equipped for the task, the ratio would be at least sixty consumers to one employee. If we confine it to well-informed senior and junior executives, the ratio would be about 1,000 to 1.

How, then, can we accomplish this partnership of confidence? The answer will clear away an amazing number of difficulties and go a long way toward solving this, the electrical industry's greatest problem.

▼

Our 1933 Sales Job

By O. B. COLDWELL
Vice-President and General Manager, Portland General Electric Co.

THE electrical industry, confronted as it is with many problems, should find a measure of relief in the development of a higher order of salesmanship in its personnel.

Many customers, influenced by the vague and mistaken ideas of those not satisfied with the present order, are thinking of the services of the utilities in terms of abstract kilowatt-hours, rather than in terms of the concrete results obtained by the application of those kilowatt-hours. The salesman of today, to be successful, must have the ability to make the head of an adequately-electrified home realize that when he pays his monthly service bill he is paying the amount charged by the utilities for insuring to the family

HARRY J. BAUER

O. B. COLDWELL

P. M. DOWNING

ADDISON B. DAY

A. F. HOCKENBEAMER

FRED B. LEWIS

living in that home better health, conservation of food through continuous refrigeration, efficient management through labor-saving devices, electric water heating and proper lighting.

Many employees, because of necessary wage reductions, have suffered loss of morale and initiative. Such employees are not rendering the proper service to the utilities. This attitude will change when the salesmen-employees see for themselves that no matter what economies are necessary, executives and department heads are recognizing, more than ever before, loyalty and initiative and are desirous of rewarding employees possessing these qualities.

Decreased revenue demands vigorous promotion of all load-building appliances. Dealers should be brought to realize that limitation or restriction of utility activity in the sales field is detrimental; that the sale of additional appliances will benefit both the dealer and the utility; and that this can best be achieved through the coordination of the efforts of the utilities and of the dealers.

A major appliance salesman, to be successful, must put less reliance in generalities and individualize his presentation in terms of the customer's specific needs and conditions. Only appeals which are pertinent to the individual are effective with the present-day buyer, and every detail of price, terms and service must be suited to his needs. Knowledge of products and the service to be rendered and attention to every detail of the transaction have never been more important and requisite.

Our job for 1933 is a sales job, demanding a higher order of sales ability in every phase of our business.

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Immediate Problem Is Load Building

By P. M. DOWNING
Vice-President and General Manager, Pacific Gas and Electric Co.

THE greatest immediate problem of the electric light and power companies today is load building. The declining trend of earnings curves must be stopped, and the only way to accomplish this is by increasing the volume of new business. Although most power companies operate as monopolies, we are not today, nor have we ever been, in a position to feel that business will come to us without solicitation or sales activity. Our business is highly competitive, due to improvements in internal combustion engines and to the low price of fuel oil. Engine manufacturers and oil companies are as keen to build up new business for themselves as are the utilities, and we must recognize the fact that this competition will continue as long as the present buyers' market for oil continues.

General economic conditions are such that if we expect to hold our present business and secure our share of new business, we must meet the situation squarely by offering a better and more reliable service at less cost to consumers. We must not be blinded by the fact that we are a monopoly or that we operate the only store in town where electric service may be purchased. We must anticipate and meet changing conditions by providing the kind and type of service demanded by the public at the lowest possible cost.

The success of a utility company under present-day conditions lies in maintaining an aggressive sales policy. New business must be developed to take the place of load we are losing. The welfare and prosperity of the entire electrical industry is involved in the utilities' ability to grow and develop. No one branch of the industry can do this selling job alone. The future prosperity of the entire industry depends upon how well those of us representing the various branches of the industry cooperate in telling our sales story to the public.

▼

A Formula for Employee Morale

By ADDISON B. DAY
President and General Manager, Los Angeles Gas and Electric Corp.

BATTLES are won because the winning army is superior in certain respects. The superiority may be in numbers, equipment, position, strategy, or a combination of these factors. Or it may be superiority in morale.

In the World War, this fact was well understood by army chieftains, and painstaking effort was devoted to the development of morale in the ranks. The same was true with regard to the civilian populations back of the armies. In our own country, we recall the appeals to patriotism and the kindling of international hatreds which were believed necessary (and probably were) to the successful prosecution of the war.

Industry requires a proper morale for its success, no less than war; but the objectives and the methods are different. The underlying principle, however, is the same; that is, the identifying of the interest of the operatives with that of the institution and the creation of an assisting emotional relationship between the management and the employee. For morale is essentially a heart relationship, rather than an intellectual conclusion.

What is this formula for morale? In its simplest terms it may be stated thus:

Proper Selection of Employees + Fair Treatment + Friendly Internal Relations + a Policy of Frank Information = Good Morale.

It goes without saying that the foundation of good morale is to be laid in employee selection. Ability and suitability, along with the disposition to cooperate, are the foundation materials.

But good materials can be spoiled by poor workmanship; and so also can indifferent materials frequently be improved by corrective treatment. Confidence must be established and maintained by an invariable policy of fair play.

Every man worthy of the name is concerned with the welfare and safety of his family. He therefore values any provision for their protection through cooperative plans of insurance and disability benefits which the company may initiate. Indeed, it is a question whether he may not expect some such provision as a right, assuming that the cost of its operation will be borne by himself ultimately.

Friendly internal relations in any institution are so necessary to its success and so possible of attainment that it would be only by gross mismanagement that any other condition should prevail.

The last factor in our formula is a policy of frank information. No one reasonably can be expected to become very enthusiastic over something which he does not understand. The policies and practices of a public utilitiy company in its public relations should be of concern to every employee of the utility, irrespective of position or of the extent of public contact. And it is one of the tasks of personnel management to stimulate that concern and to provide the information for its satisfaction.

Let it not be assumed, because the widespread unemployment has practically abolished labor turnover, that the question of morale has lost importance. Quite the reverse. Operating conditions under depression circumstances call for high morale and close cooperation in securing the best results with the greatest economy.

In addition, the public unrest has turned in the direction of the utilities, and the public memory has lost the picture of the uniformly low rates for utility service which prevailed all through the boom times of high wages and higher commodity prices. The utility employee can carry the true picture back to the public—if he himself has the picture and if he is interested in the utility's welfare. Good employee morale, according to our formula, will accomplish it.

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The Stockholder—Forgotten Man

By A F. HOCKENBEAMER
President, Pacific Gas and Electric Co.

ONE forgotten man is being overlooked in the wave of fantastic and visionary attacks against the utilities. He is the stockholder who has invested his savings in the light and power companies. Whether his is a direct investment in common or preferred stock or an indirect one in a savings bank deposit or an insurance policy, his interest in the welfare of the utilities is as paramount as that of the consumer or the

H. L. MASSER

L. T. MERWIN

W. C. MULLENDORE

public. In losing sight of this fact, those who are sponsoring the drives for increased taxes and lower rates are ignoring one of the fundamentals of regulation.

The case of Pacific Gas and Electric Company may be cited as typical. Half of our common and preferred stocks are owned by residents of California. The 70,318 California stockholders are scattered through every county in the state. Most of them are in the salaried or wage-earning class and more than 50 per cent are women. Their average income from annual dividends is $139. This is public ownership in the truest sense of the word.

Today the platform of government and business is to restore purchasing power. I cannot see the wisdom, then, of a policy that may decrease purchasing power. Because the utility companies have been well managed, conservative and relatively stable through three years of adverse economic conditions, they have been made the target for all manner of radical proposals, the fulfillment of any of which may break down confidence in the integrity of their financial structure. I cannot see where any tax increase or devitalizing, drastic rate reduction will accomplish more public good than will the maintenance of purchasing power represented by the dividends paid by this or any other utility, particularly when ownership is largely vested in the public itself.

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Reading The Meters

By FRED B. LEWIS
Vice-President and General Manager, Southern California Edison Co. Ltd.

TO THE layman visiting a modern generating plant, one of the amazing sights is the array of meters and instruments which, to him, are as unintelligible as a page of Greek manuscript. Yet the successful operation of the plant depends upon an ability to read and interpret the messages which these instruments convey. They may report that all is well or they may sound a warning that some condition is developing that needs attention and correction.

Likewise, the manager of a modern utility is confronted with a maze of indicators which are meaningless to the uninitiated, yet a thorough understanding of what they say is vital. Some of these are old, and long experience with them makes their story fairly clear; others are decidedly new and we must sharpen our wits to comprehend them. Among the more familiar of these indices are such old-timers as bank clearings, building permits, weather reports, population records, car loadings and Dow-Jones averages. They are as simple as a voltmeter or a steam-gage. Long association makes their interpretation easy.

Such is not the case with the more recent and more intricate devices which are the product of today's complications. Still, they tell important stories which must be considered in relation to all the other meters on our economic switchboard. For example, the reports of the Federal Reserve Board have taken on a new significance. The dollar, which we were accustomed to consider rigid, suddenly has became elastic. We are paying attention to francs and pounds. We are obliged to devote a cat-like vigilance to taxation in all its ramifications. We study the ratio of employment, because it has something to do with purchasing power and the probable sale of appliances. We endeavor to weigh all known factors and then to determine when, and how, and in what volume new business is going to be offered.

The technique of management is subject to constant change. An act of Congress or the State Legislature suddenly may introduce new factors on the plan of operation. A decision of the Supreme Court may alter some fundamental philosophy of the utility business. We must know how to read the meters.

All of this applies to the juniors in the industry as well as to the seniors carrying the full duties of management. The young fellows, who are learning the trade and who aspire to positions of greater responsibility and opportunity, need to acquaint themselves with these new phenomena which heretofore have not been "in the book." They should be able to discriminate, for now, as always, many sound theories are promulgated and false doctrines advanced. The electrical industry always has had difficulties to surmount and always will have them. The only novelty of today's situation is the rapidity with which conditions fluctuate. They are not unduly alarming to an organization trained to meet emergencies.

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A Problem Of Education

By H. L. MASSER
Vice-President and Executive Engineer, Los Angeles Gas and Electric Corp.

IN times of great economic stress, as now, our governmental agencies frequently are prone to favor the levying of unbearable tax burdens (on utilities), and to hearken to unjustified clamors for rate reductions. These often are unwise expedients and fail to provide a sound solution for the existing problems. The utility business is entitled only to a fair return upon the value of its property, but it is entitled to that return. No good to the community will result from the strangling of any fairly- and properly-operated large business enterprise. The payment of a few cents per dollar of additional tax may appear to the individual as a negligible charge; yet, when focused in its aggregate to the earning statement, it will amount to a very large percentage of the entire net. An apparently trifling rate reduction, which even today may amount to almost nothing so far as any one customer is concerned, totals to a great sum for the utility at the end of the year.

It is only through widespread recognition of the over-all desirability of fair taxation and compensatory service rates that the utility can continue its business in a manner that is beneficial in all its phases to the territory it serves.

It is incumbent upon the leaders of our industry to make the facts and requirements for sound economic policies for utilities known and appreciated much more widely by our own employees and by the public at large. We have before us the problem of education, not propaganda, as it is so prone to be called, but just plain straightforward, truthful telling of our story. The personal contacts of our employees with customers and with friends provide the best avenue for creating favorable public acceptance of the company they work for. And I think it can be stated accurately that as a group, utilities have maintained on their active payrolls a far greater percentage of their employees than any other large branch of industry.

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Time to Be Militant

By L. T. MERWIN
Vice-President and General Manager, Northwestern Electric Co.

THE electrical industry must needs take a more militant attitude—right now! While it has not, even metaphorically, turned the other cheek to receive another swat, it has supinely allowed the aggressor to walk around to the other side and deliver further blows—and then back again he comes to repeat the process.

Lies are lies—why not nail them?

All right, you say, tell your customers. The vast majority of the voting public receive your service. You reach them monthly through your service bill. Put in a stuffer and tell your story.

Fine, but not enough. True, too little of that splendid avenue is used. But that is not sufficient. Somehow the customer is suspicious of bill stuffers, if that is all he sees or hears. Seems to have a timid under-cover appeal. Use the stuffer, but repeat openly in talk, billboard, newspaper space and every other avenue of attracting public attention.

And repeat! Everlastingly repeat! The other fellow does and that's why he gets his story over.

Where you're wrong admit it—no harm in that. But where wrong, correct. And when accused of evil and the accusation is false—why not call the lie. People are essentially honest and like fair play. Only the tender hearted befriend a whipped and skulking dog—and right now most people are too busy nursing their own troubles to be-

friend a waif. But everybody will pause and watch a good scrap, and most people can and will insist on fair play.

Time to be more militant!

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Industry More Important Than Its Critics

By W. C. MULLENDORE
Executive Vice-President, Southern California Edison Co. Ltd.

AS WE assemble for this "Convention in Print," Chicago's Century of Progress Exposition is paying glowing tribute to the electrical industry through the use of the mystic medium in the most spectacular fashion ever devised. It is no accident that electricity in its myriad of applications is selected as the symbol of this ultra-modern exhibition for, since its admission into modern industry, electricity more than any other medium has been truly symbolic of all that is progressive. Its mystery intrigues the mind of the seer, while its versatility appeals to practical men in every conceivable activity.

Many times during the past few months we have been reminded that virtually the entire history of our industry is confined within the forty years separating Chicago's two great expositions. The novelty of forty years ago has come into such general use that its absence in any home, shop or store is conspicuous.

The service of the electric utility is largely unselfish. In its early stages, the financial problem was so difficult that profits were impossible, and for the past twenty years regulation has limited the return so that a surplus such as might be expected in any other line of business could not be accumulated. Rates have been reduced consistently. The policy has been to give the consumer a constantly-improving and broader service at steadily lowering cost. The magic of the laboratory has been brought into popular use with amazing speed. Unquestionably the public has benefited.

What, then, is the reward of this industry, emblematic of all that is modern and recognized by law as being in the public interest? Chiefly, the reward must be found in the satisfaction which comes from the performance of our obligations as they arose—meeting increased demands not only with increased, but constantly improving service at lower and lower rates. We have been praised. Our handiwork has received much acclaim. More recently, we have met with lack of appreciation and a condemnation which we find difficult to understand.

The industry has been pilloried unjustly by a militant minority. With one or two others it has been selected as a scapegoat to atone for the sins of radical politicians. By them it has been impugned, derided, berated, slandered, defamed, reviled. It reminds one of Shylock's soliloquy:

"Fair sir, you spit on me on Wednesday last;
You spurned me such a day; another time
You called me a dog; and, for these courtesies,
I'll lend you thus much monies."

There are those in the industry who are discouraged by these unjust attacks and wonder if the fight is worth while. "Why," they ask, "should we spend our lives in this business if our only recognition is to be public abuse?"

This is not our "only recognition." This criticism will pass, but our works will endure, and our contribution to mankind in the end will be measured by our works, rather than by our critics' misrepresentation of our worth.

We should find comfort in the thought that nothing great ever is accomplished without catcalls from minute minds. In its infancy, every great industry has been ridiculed; in its maturity it has been envied and slandered on the theory that there is something immoral about success. Columbus was jeered, Galileo was exiled, George Westinghouse was called a fool.

If man always had succumbed to such treatment, we still would be in the stone age. It is only by being able to ignore unjust attacks and to plod steadily onward that progress is made. In relation to humanity, the electrical industry is far more important than its critics. Its march has just begun. It has a destiny to fulfill.

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Tax-Exempt Yardstick Is Not 36 Inches Long

By FRANK T. POST
President, The Washington Water Power Co.

AD VALOREM taxes, net income and excise taxes—both Federal and state, municipal licenses, municipal occupation taxes, taxes and more taxes—such seems to be the order of the day. The fact that excessive taxation must be reflected in rate schedules seems to be lost sight of. The municipalists vigorously campaign against every effort made by overburdened taxpayers to have municipally-owned utilities taxed the same as privately-owned utilities, or at all. It is axiomatic that tax-free municipally-owned utilities and their tax-exempt bonds increase the ad valorem taxes which are properly chargeable against privately-owned utilities and all other taxable property. Under such circumstances it is idle to talk about a "yardstick." A tax-exempt "yardstick" is not 36 inches long.

These plain truths should be repeatedly told with an abiding faith that this injustice and economic absurdity eventually will be corrected.

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A Cycle of Misunderstanding

By W. F. RABER
President, San Diego Consolidated Gas & Electric Co.

TODAY our industry is challenged by a dangerous cycle of misunderstanding born of an economic crisis. The commercial and financial insanity of 1929 has given way to suspicion and that suspicion has now crystalized into demands for investigation. Investigation under normal conditions dealing with normal human emotion is welcome, but the uncertainty of hasty action, the result of easily-swayed mob influence, creates for us an atmosphere of tense expectancy as to the future.

There is every indication that the country is fast renewing its confidence in our national government. This confidence will be reflected throughout all realms of government and business. In the meantime, we as an industry are faced with greater competition in the congested areas, our tax burdens are on a constant increase, we are subjected to insistent demands for lower rates in face of a decreasing rate of return.

The answer to our future welfare lies in our ability to carry on with recognized efficiency, meeting every challenge with the best interest of all consumers foremost. Our service must be made so attractive as to alleviate unfair competition.

Most assuredly there is a limit to curtailment in accounting and operating costs. Without a doubt, increased taxation, reduced income and demands for lower rates will find an immediate reflection in a less liberal policy of line extension. Business must be built within existing territorial boundaries and such limitation calls for resourcefulness on the part of our commercial departments. They must find new outlets for our service. They must concentrate on many types of current-consuming devices and dispense with specialty selling. Today's situation is an opportunity for sales forces to diversify their activities with the one objective of selling kilowatts.

Greater stress should be accorded cooperative selling through dealers and distributors and all activity should be supported with more and better directed advertising.

Such a program calls for executive interest and a supporting budget.

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Our Goods Never Were Over-Priced

By G. C. WARD
President, Southern California Edison Co. Ltd.

LEGISLATION—it is the modern thought—is to cure all ills. I am thinking now of business legislation. What malady pursues us? In what direction should we look for a cure?

Business is no more than the exchange of one thing for another. If each item is properly priced, both buyer and seller profit by their trades. If sellers make fantastic charges, buyers cannot continue long. When the

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buyers stop, the sellers, too, must go out of business. All, I think, will agree with these fundamentals. Perhaps many will agree with the further conclusion that the primary cause of our present troubles was over-pricing in some fields—with resulting inability to pay on the part of those who must furnish the bulk of the buying power if the nation's business is to go on.

In such inequities, the nation's operating electric power utility companies had no part. At a time when some manufacturers made as much as 100 per cent on their investments in single years; when some workers were paid from $10 to $20 per day; when some financiers found their rewards fixed in astronomical figures—while the great bulk of the citizenry of America received on the average less than various surveys fixed as a minimum standard of decent living—the operating electric utilities were paid no more than the actual cost of their capital plus necessary expenses.

Will it now stimulate fair business to assault those who have always conducted a fair business? Should not correction be made where the trouble started? Will it profit the nation to destroy those who are still in business—fair business—or would it be better to build up trading where trading has now all but stopped? Someone said long ago, "It is not possible to make all men rich by law; it is possible to make all men poor by law; the latter has often been done in human history."

Political leaders, a large part of their former revenues having disappeared, now look to the industry that never inflated and that, in consequence, still is able to do some business, as the source of new revenues. The always sanely-run operating utilities are looked to for additional tax funds. This trend of the times faces in the wrong direction. Sound public policy should look to curing evils rather than toward creating new evils.

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Present the Facts To the People

By A. B. WEST,
President, The Southern Sierras Power Co.

ELECTRICITY has become a necessity in the home. The spread of misinformation about its units of cost to consumers, therefore, may attract the attention of hundreds of thousands of people; and unless it is controverted effectively, it becomes accepted as fact, and results not only in pressure being brought to bear upon the Railroad Commission for rate reductions, but also a clamor on the part of politicians either to usurp the prerogatives of the commission itself by granting rebates on rates already paid or to penalize the companies by a heavy increase in their gross earnings' tax.

The arguments of the power companies have been made time and again in ELECTRICAL WEST and other electrical magazines; charts have appeared frequently, proving that electric rates did not rise in proportion to other costs during and after the war and are lower now on the basis of 1914 prices. But the people at large do not read the electric magazines, and it is important to present the story to them in newspapers and periodicals generally circulated in the territories served by the respective power companies, if for no other reason than to disabuse their minds of a prejudice against these companies because rates apparently have not decline in recent years as fast as commodity prices.

(Ed. Note—Mr. West's organization has brought such a story to its customers in an admirable fashion, and a story of how this was accomplished has been written by Mr. West and will be published in an early issue of EWEST.)

A. B. WEST

J. B. WILSON

A. EMORY WISHON

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Bring the Head Office Nearer the Small Town

By J. B. WILSON
President, Coast Counties Gas and Electric Co.

POWER companies are local in nature; therefore, they definitely are interested in local policies, local problems and local conditions in every community which they serve, whether it be a large city or a small town.

In almost every community of any size, the power company has a local office and a local manager who in time is looked upon by the average consumer as the "power company." But in many cases the business and professional men in these same communities are supersensitive to the fact that the local office is merely a branch of a large organization, and they do not know and are not known to the head-office executives. This feeling of vagueness often leads to merchandising problems and commercial misunderstandings which could be solved easily, if not altogether avoided, by personal contact and knowledge of conditions between these men and the power company executives.

Therefore, since the district cannot come nearer the head office, why not bring the head office closer to the district? During this coming year, with its many problems and changes of both political and commercial nature, why not spend some time becoming personally acquainted with the business and professional men in your districts? Only in this way can the power company gain local ears, local sympathy and confidence. The people, merchants and manufacturers in the small communities at all times are interested in meeting the executives of the company serving their community.

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Keep Faithfully At Our Job

By A. EMORY WISHON
President, San Joaquin Light and Power Corp.

THIS is a time when a prayer to our industry to have faith in itself, to go forward with clear heads and confident hearts, ceases to be merely platitudinous "pep-talk." It might have been that in our prosperous all's-well-with-the-world yesterday; but in the light of the present, it is sincere and meaningful appeal, setting forth in simple words a simple creed to which we should steadfastly adhere.

These are trying times for the electrical utilities. We are being beset on every side. Adverse legislation threatens in many directions, taxes are being increased, agitators and demagogues and the radical press are attacking us. Meanwhile, power plants are standing idle, revenues are off, new business does not begin to offset losses of old business. Our working personnel is reduced to a minimum, and all workers are on part-time schedule.

This will pass. America has survived other depressions. She will survive this depression. Industry will resume, our idle millions will go back to work, and we shall inevitably experience another period of prosperity. And when that time is here, our people will be able to pay their bills. They will appreciate once again that their electric rates are low, that the power company is a community asset, and that in surviving the depression's storm it has vindicated the judgment of those whose savings have helped to build it. They will recognize, too, that the stable well-managed industries such as ours, keeping on a steady course through these disastrous times, were the big factors in preventing complete economic chaos.

Our course is plain. A better day is coming, and in anticipating it we must keep steadily at our job. That job is to render a service—high-class, thorough, dependable service, at the lowest possible rates consistent with sound business. Above all else, we must not lose our perspective in the irritations and apprehensions which radical attacks create. Electricity cannot be sold below cost; we have no magic treasure chest into which we can dip to meet deficits. Our only source of revenue is in the sale of current. Upon that revenue depends our ability to keep the business going and to render adequate service. The people, our customers, know this. But right now they are influenced by emotions rather than by reason. In final action, the people are fair and just. When the clouds of depression have cleared away and they are no longer harried by their present financial worries, they will be fair and just to us.

It is necessary for us to keep faith in ourselves, believing in our individual futures and the future of the industry. The best way to exemplify that faith is to give to the public the best possible job that is in us, a job inspired by the highest ideals of service.

"COMPETITION"—

What Sins Are Committed in Thy Name!

THREE years of depression have added some new words to the vocabulary of business. "Chisel" and "racket" are two of them. Unfortunately for the electrical industry, both of these terms are becoming increasingly significant as the struggle for self-preservation sees ethics thrown overboard, and sane business practices, which have been the outgrowth of years of harmonious cooperation, cast to the four winds. Policies have become scraps of paper in many instances, and prices are—well, usually anything that the seller thinks he has to give in order to beat the "competition." And as for profits, the race apparently is to see whether the manufacturer, the wholesaler, the contractor or the retailer goes broke first.

Don't get the idea that I am a pessimist or that the electrical wholesaling industry, in whose interests I speak on this convention program, are pessimistic. We are not. But if it would shock the whole electrical industry into an appreciation of the dangerous trends which threaten to disrupt progress, to destroy confidence between the various branches and to shatter the strong distribution chain which has served the industry so well during times past, I would use stronger words than "chisel" and "racket." Only, in that case, ELECTRICAL WEST'S printed convention would be barred from the mails.

In so far as all industry is concerned, I want to brand as Public Enemy No. 1 the "chiseler"—that buyer of goods, supplies, appliances or equipment, electrical or otherwise, who uses his advantage as a purchaser to browbeat, harry or bully the seller into price concessions which represent less than cost plus a fair and reasonable profit. And as Public Enemy No. 2 I would name the price cutter—the racketeer who, in order to obtain an unfair competitive advantage, offers his goods for sale at less than cost or waives his legitimate profit in order to cripple a competitor or to obtain volume. Certainly the electrical industry has no place for either of these; and the sooner this realization dawns, the sooner we may expect black ink to replace red on our balance sheets.

One simple step which will go a long way toward minimizing both of these evils can be taken by the utilities and the large industrial organizations. Purchasing policies can be raised to the same high level of ethics and principles as sales policies. One cannot help but be puzzled by the thinking which will permit the pronouncement of a sales policy which is designed to promote confidence in the integrity of a company and good will toward its products and name on the one hand, and the practicing of a purchasing policy that breaks down confidence, arouses suspicion and destroys good will on the other. If this is not short-sightedness, then you give it a better name. Draft purchasing policies for the welfare of the whole industry with the same care that sales policies are drawn, and "chiseling" and price cutting will largely disappear. Furthermore, the whole level of the industry will be raised one notch higher toward prosperity.

It is a severe indictment of business when ethics must be legislated, but such seems to be the case if we correctly interpret news of the last few weeks from Washington. If we ourselves cannot stop price cutting, then the government threatens to do so by declaring the sale of goods below cost as contrary to public interest. Yet for years there have been on the statute books laws which permitted an association or an industry to define fair trade practices and to set its own house in order.

Fair trade practice rules will stop "chiseling" and price cutting if in no other way than by defining that which is right and reasonable and that which is wrong and contrary to the welfare of business. We wholesalers may be accused of past contamination, but today we have such rules and are enforcing them for our own self-preservation. Such self-regulation we commend to the other branches of the industry, so that during this period of economic readjustment there may be worked out a strong chain of distribution that will serve the public adequately, completely and fairly, and at the same time permit all branches of the industry to work together harmoniously and profitably in developing the electrical market.

Price courage, buying courage, selling courage or whatever you wish to call it would bring order out of chaos almost immediately. Speaking for the wholesalers, an increase of one point in the gross margin, which would automatically come with fair purchasing practices, would stabilize our business, put people back to work and redound to the benefit of all buyers and sellers. The "chiseler" and the price cutter are of no benefit to themselves or to the community. We want none of either in the electrical industry.

The Address of

D. E. Harris

Vice-President, General Electric Supply Corp.

FOR PRICE—*But What a Price!*

The Address of

W. R. Marshall

Vice-President, Westinghouse Electric & Manufacturing Co.

THE PAST three years have been years with problems for everyone, not excepting the electrical manufacturers. As the volume of business continued to diminish, these problems became magnified in importance and multiplied in number. Without enumerating them all, there is one upon which I wish to dwell here, because it embraces not only the manufacturers themselves, but the future of the entire electrical industry; I refer to the growing inclination on the part of utilities, electrical and steam railroads, and large industrials to buy on price only, without consideration of the other factors normally considered when making purchases.

That in itself would not represent a problem for the more progressive manufacturer because, if price were the first and only consideration, the larger companies certainly could hold their own in producing at lower cost than their smaller competitors if only the manufacturing and distribution angles were considered. One of the justifications of manufacturing on a large scale is that it helps to eliminate waste—tends, through coordination, to efficiency—makes possible the installation of improved production methods and labor-saving devices on a large scale. All of these contribute to a better product and lower costs.

But that is only a part of the problem. Modern scientific progress demands costly experimentation and research along electrical engineering lines and, in the past, the responsibility for development has fallen upon and has been assumed by the larger electrical manufacturing companies. It is logical that they should do so, for the large utilities cannot because they dare not, with some exceptions, endanger their system operations in experimental investigations. Colleges also cannot carry on this work except in certain investigations of some specific phenomenon. The willing acceptance of this burden by the electrical manufacturers has resulted in the advancement of every branch of the industry, as its phenomenal growth in the first third of the century will testify.

If research and engineering development are subjugated to concentration on price lowering, there soon takes place "a debasement of quality which can only mean a lowering of performance standards and a deeper drain on all incomes."

Prof. Philip Cabot, professor of utility management at Harvard University, states, "Without the energy and genius of the electrical manufacturing companies the power industry would never have been born and its rapid growth would have been impossible. Even today, the public utilities depend upon the manufacturing companies because progress depends upon invention and invention depends upon research."

This being the case, what will happen to our electrical progress if research is curtailed or abandoned? Of course, we know what the answer is: Research, invention, engineering development and experimentation should not falter, but continually forge ahead. But the question is raised, who is going to pay for this development work?

There is a business principle accepted as axiomatic that the price of an article cannot be less than the financial cost of its production. In other words, every dollar paid out in the process of its development, production and distribution must be recovered in price. That being true, and if leading manufacturers carry on such research and development work for the benefit of the industry as a whole, the only way they can be compensated is by including this expense in the price of the product.

Competitors who do not carry on research and engineering development work cannot offer products having the same degree of quality and improvement except as they approach it through copying as near as possible what the most progressive companies, both large and small, already have accomplished. And here let me say that in a number of cases, due to ingenuity in design or specialization on a single product, some smaller companies have produced very splendid articles.

Manufacturing companies who refuse to bear a share of the expense of research work, engineering development and experimentation, obviously are in a position to quote lower prices than can the larger companies who carry on this work. The rub comes when the purchaser demands competion on a flat dollar-for-dollar basis and will not give due credit or recognition to the quality that has been built into the product by the forward-looking manufacturer nor to the background that has permitted a specific product to be produced. Such purchasers fall into the category of those who want "to have their cake and eat it too."

There appeared in the August, 1932, issue of the "Transit Journal" an editorial entitled "Unfair Purchasing Practices Harmful to the Industry." The leaders of the electrical railway industry recognized that an unfair condition existed in their industry, and the executive committee of the American Electrical Railway Association prepared a resolution condemning the practice as being contrary to the best interests of the manufacturers and the railway operators; the resolu-

tion received unanimous endorsement. This resolution pointed out:

1. The legitimate manufacturer of electrical railway material, having developed the art and having a reputation to maintain, furnished materials best selected for the purpose and built to cover the accurate gages so that proper association and coordination of the parts is obtained.

2. The legitimate manufacturer is involved in more than supplying the few detailed parts and has an obligation resting upon him to carry on experimental and development work in order to provide new and improved devices for the advancement of the art.

3. The legitimate manufacturer stands ready to serve the industry at all times by maintaining a plant and organization and stock. Without the readiness to serve, the industry as a whole would be very much handicapped in its operations.

This resolution sets forth that, judged merely on a price basis, products made by parasitic manufacturers may appear attractive, but, looking at it from the broad standpoint of the welfare of the industry, it is clear that the practice of buying on a price basis from such competitors of established manufacturers is both unfair in principle and uneconomic in practice.

The point so often has been raised by certain purchasers that dividing the business among all compeitors is necessary in order to keep them in existence to maintain competition. This seems to be an uneconomical thing to do. If we accept Professor Cabot's statement that progress depends upon invention and invention depends upon research, then in order for our nation to progress electrically, someone has to carry on the research work.

As the cost of research and development work must go into price, it cannot be reasoned that, by placing certain business with low-priced competitors whose attention is devoted to a single line of products or a line serving only one phase of the electrical industry, such competition should result in lower prices on the part of the larger companies. Theoretically, every dollar's worth of business placed with competition having inherently lower prices increases the price on the products made by the more progressive manufacturers because it decreases the volume over which the cost of research and development work can be spread.

Public utilities particularly are concerned with the need of research, experimental engineering, large power testing laboratories, etc., because they are an accepted monopoly and it is their desire to render such service to the public that there can be nothing but the highest praise for that service. Of course, they must render such service at a profit. Their costs, too, must be absorbed in price, and consequently they wish to keep them at a minimum. But they cannot keep their costs as low as they would like because public relations demand a continuity of service, irregardless. This same continuity of service, however, is to the benefit of the utilities because of a continued income while such service is unbroken.

This condition on the part of the public utilities makes it paramount that there be a never-ending search on the part of someone (and it has fallen naturally on the shoulders of the larger manufacturing companies) to improve methods, to develop new materials that will last longer and give increased efficiency, and to improve designs that will simplify operations and insure greater continuity of service. All this tends toward increasing utilities' income and decreasing their costs, making it possible to show increased profits or to permit of decreased rates with the usual consequent increase in consumption.

Taking a far-sighted and unprejudiced view of the problems confronting the manufacturers of electrical equipment in these times which make corporate existence precarious, it should be apparent that legitimate profit can be the only yardstick for measuring the value which consumers place on products and services. Now, more than ever must every item "pay its own way." Consider, then, the following facts:

1. That the progressive electrical manufacturers have sponsored and paid for research, engineering and development that largely has been responsible for the growth, application, convenience and reliability of electric power;

2. That these electrical manufacturers have contributed in no small measure to load-building through their institutional advertising of appliances and equipment and their selling organizations;

3. That these electrical manufacturers have made electrical equipment and energy-consuming appliances available to the smallest factory and most modest home by lowering production costs and adopting modern production methods;

4. That these electrical manufacturers have cooperated in the upbuilding of the industry and the establishment of sound industry policies by a whole-hearted support of the various associations of the industry, such as N.E.L.A., the Cookery and Refrigeration councils, the A.I.E.E. and others.

These are real contributions to progress, evidence of a genuine desire to cooperate with the industry in all its activities. No one can question their value or wish to see these activities abandoned, much less be a party to such an action. The major problems of the electrical industry are external rather than internal, and the whole-hearted cooperation of every branch of the industry is needed for their solution. To maintain their share in these cooperative activities, the progressive electrical manufacturers ask for a pair price that will include recognition for the background of service to the industry that is reflected in the quality and advanced engineering of their products. It is a just request and one which should be given serious consideration by managements who have faith in the electrical industry and its future. —The Editor

The question before the progressive manufacturing companies now is: Can they afford to carry on this exacting work for the benefit of the utilities, railways and larger industrials and, at the same time, be placed in the position of having to compete on a price basis against those companies who do not render such a service to the industry at large?

We have faith that utility and industrial management will give due recognition to what has been done and still is being done in advancing the art, by establishing purchasing policies so that pioneering developments will not be jeopardized because of the "condition of the times."

Are Rigid Rates Unsound?

The Address of

E. K. Murray

Director of Department of Public Works, State of Washington

REGULATION is on trial! Will it function? Can it function? Probably not without material changes. The problems presented call for clear, bold thinking—just as bold and even more clear than that which brought regulation into being in the first instance.

Our accepted doctrines of regulation have been as much the product of the public's side of the controversy as that of the public utilities', and both parties have dodged from one side to the other of these doctrines. That in itself is sure proof that, in some ways, they are unsound.

It is going to become necessary to re-examine some of our accepted and settled doctrines in the near future. While our fundamental concepts of fair, just and reasonable rates remain unshaken, the final form in matters of regulation is subject to change. Such adjustments as are made in our economic system necessarily must be reflected in our public utilities and the regulation thereof.

Only recently, the methods of arriving at valuations in Washington were changed so that the department could fix a fair value after taking ALL elements into consideration. In addition to the conventional factors of historical cost, reproduction cost and present depreciated condition, the department may apply principles having a fundamental relationship to current economic conditions.

For regulation to be successful, it will be necessary to find a more expeditious way of fixing rates than the present orthodox procedure. Present methods of arriving at valuation are cumbersome. For a regulatory body to establish a rate base, it is necessary to hold a lengthy and expensive appraisal and a still-longer hearing, with the attendant possibilities of legal entanglements after its conclusion. Cases sometime drag on for years. This is not regulation, it is litigation.

Rate base, value of service, rate of return and all the devices for arriving at them are, in turn, but devices intended to aid in determining what are just, fair and reasonable rates. There is nothing sacrosanct or sacred about any of them. They are not to be followed except as they serve the purpose for which they are intended.

This is a period of experimentation. What is needed is a short-cut in establishing rates, perhaps by taking book values, making quick adjustments on the basis of some economic index such as commodity price trends, adjusting depreciation and other expense accounts and arriving at a rate somewhere in line with current economic conditions.

I am inclined to the opinion that we invite ultimate trouble when we introduce an element of fixity or rigidity into our economic system. The theory of rigid rates and a fixed return fundamentally is unsound and will not work through good times and bad. It must be abandoned in favor of a rate flexible enough to follow other prices. When to take such action is questionable. Perhaps the abandonment during bad times is necessary for the return of good times.

Taxes also have a tendency to assume rigidity, and our business and political leaders, including our president, insist that, by their very rigidity, they constitute a major obstacle to recovery. There is sound logic in this conclusion. But utility rates, including those for transportation, assume even greater rigidity than taxes and are more important, both in amount and number of people affected, than taxes. If prices all went down together, this would be unimportant. It is the fact that some prices become increasingly out of proportion that counts, and utility rates are one of the worst offenders. It may well be that reduced rates, resulting in immediately-reduced revenues, will, in the end, so speed up economic recovery as to total up to a greater amount of revenues than would have been produced by existing rates.

Who can say that a "fair return," set up during one set of conditions, will be "fair" under a totally-different economic environment? Just how much property is "used and useful" in the public interest? To illustrate this point, take a generating station that was constructed, say, in 1929. Now, that plant is idle, neither used nor useful in the public's service because the depression forced some consumers off the company's lines and cut off the source of anticipated consumers. Is it fair to ask the remaining consumers, already harassed by the current conditions, to assume the additional burden of carrying the fixed charges on idle capacity? Other businesses have idle capacity, too, in times like these and the investors in them suffer greatly-diminished rates of return, in most cases no return at all.

With a fixed rate of return, as in the utility business, the cost of power assumes a relatively-higher proportionate cost to consumers in hard times. That is unsound; it should become cheaper; and that is what causes me to question the long-time workability of our rigid fair-rate-of-return system in the recurring cycles of business activity. Perhaps a more flexible rate, based upon the value of service, would be more practical.

In fact, the department has just filed a complaint challenging the reasonableness of the irrigation power rates in its territory.* Here the situation is particularly acute. Not only has the farmer's cost of electricity for domestic use more than doubled proportionately to his

E. K. MURRAY

*(Ed. Note—See NEWS.)

income, but likewise the cost of irrigation power enters more heavily into the cost of the products by which he earns his living. The department intends to inquire thoroughly into the question of value of service and the farmer's ability to pay. It also intends to conduct the hearing along broad lines to determine whether it is economic folly to permit available water power to flow to waste merely because we have established a rate—under different conditions—that the farmer is unable to pay. It may be that the most sound, constructive and financially-remunerative thing that the company involved could do would be to materially lower the rates. The effect of this, not only on the farmers and consumers, but on the entire community, might prove both far-reaching and beneficial. At least, the situation calls for a trial.

There is no reason why we shouldn't forget about common and preferred stock dividends in times like these and adjust the value of service to conform to economic conditions. Conversely, such omissions would be given full consideration in good times by a higher rate than normally is considered reasonable for utility stocks. Furthermore, by allowing a much faster rate of amortization in good times, a fund could be built up which would tend to reduce the rate base and bring the 400 or 500 per cent ratio of investment to income that now exists in utility capital structures more in line with the financial structure of other businesses.

Summarizing my views, successful regulation depends upon a much more rapid and flexible method of determining rates than now exists. Rates, themselves, should be more flexible, and consideration should be given the "value of service" aspect in their determination. If this can be done equitably and fairly, I believe it would result in more stable and prosperous communities and equally stable and prosperous businesses within them.

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Budget Supervision Needed

The Address of

C. M. Thomas

Commissioner of Public Utilities, State of Oregon

WHAT is regulation? The law from time immemorial has recognized that the people possess the right to provide themselves with the machinery to function in all matters pertaining to that which all the people are interested in. This includes the right to raise money for, construct and operate public water, light, power and telephone systems. The public has the exclusive right to do this, or, if it chooses, it may delegate this right to private interests; but if it does permit others to enter such a field, then, under the well-settled law, such private company, corporation or individuals are encumbered with a public interest, which means that the private company shall not charge and collect all the traffic will bear, shall not make excessive and exorbitant profits from the public, but shall give service and take only a reasonable profit. This reasonable profit is called a fair return.

A fair return contemplates that the utility shall collect sufficient funds from and through rates to enable it to pay all operating expenses, provide depreciation for replacements, meet all other legitimate running expenses and, in addition, realize a fair profit on the value of its property used and useful in the public service. In other words, just, fair and efficient regulation will always provide a sufficient return to keep the company sound and healthy at all times. It will protect the investor even against unscrupulous officials, and assure the employee a fair and reasonable wage.

This is the doctrine that all utility leaders have endorsed and preached and which those who are engaged in the utility field advocate. It is the doctrine which if practiced with honesty and integrity, would be fair to the public, investor, employee and utility. But it is not so practiced, and that is the reason why regulation has failed to date. Conflict arises through the interpretation of what constitutes a fair return.

A fair return is based on the valuation of the utility property used in the public service. No consideration is given by the courts to cost of money. Many commissioners, including myself, believe that this basis to be unfair for this reason. The fixed charges should be paid on the basis of actual cost and the rate of return applied on the balance.

Among specific reasons for the failure of regulation to date are:

1. The length of time necessary to reach the final court decision through the maze and labyrinth of investigations, commission hearings and court appeals. The Chicago-Illinois Bell case is now in its tenth year.
2. The failure to recover through final decision the benefits the rate payer is entitled to, for the reason that the courts have held that excessive rates collected prior to order are the property of the utility and not of the rate payer.
3. The burden of proof is now upon the public.
4. The utility under the law is not limited in expenditures and the rate payer pays them.
5. The public, through its commission, always is hampered by a poverty-stricken fund that is entirely inadequate.
6. The public never has been interested in safeguarding its interest through legislative acts, and the law of regulation, as written, owes its parentage to utility efforts to protect themselves.
7. The procedure for the trial of cases intentionally has been written into law by the utilities so that it is cumbersome, unwieldy, expensive and time-consuming to the extent that effective enforcement of commission orders is prevented. Court procedure, to be effective, must provide for speedy relief. Knowing this, the utilities have provided the reverse.
8. The method that the courts have provided for the basis of a fair return, as already stated, results in giving utilities a yardstick of measurement which provides excessive and exorbitant returns.

My personal conclusion is definite and positive upon this question. I sincerely believe that the commissions of the United States are composed, generally speaking, of honest and honorable men endeavoring to serve the public. But, as pointed out previously, in almost every state of the union, the Federal Trade Commission, under the very noses of these same commissions, including the Oregon Commission, has developed watered stock, write-ups and inflated capital resulting in excessive profits and charges to the rate payer.

I am telling you frankly that, notwithstanding all that has been said in regard to the czar-like powers of the Oregon Commission, the problem before us can never

be conquered under the authority given by present laws; and unless the people of Oregon give increased powers and adequate funds, satisfactory results can never be obtained.

Confronted by this situation, I drew up and presented to the Legislature a measure which, if passed, would have given the people authority to compel fair treatment. This bill incorporated seven fundamental points which I consider necessary for an efficient form of commission regulation. These points are as follows:

1. **Supervision of budgets of utilities.** This would require the submission of budgets to the commission, and would give it the right to strike out imprudent and wasteful proposed expenditures, including holding company fees, and to reduce salaries to a proper base. The people's representative, residing in the same community where the company operates and aided by a competent staff of engineers, would pass on the budgets with the idea of preventing imprudent and unwise expenditures. The aggrieved party in controversial matters would have recourse to the courts, but the money could not be expended for rejected items until a reversal of the commission's decision had been handed down.

2. **The recapture of excessive earnings.** This would provide that excess earnings, over and above the fair return, be retained in a trust fund and expended under the order of the commissioner for the benefit of the rate payer.

3. **Public utilities desiring to enter the field in Oregon should incorporate in that state.** The benefits of this would be great, especially in connection with securities, as it is impossible to properly regulate and safeguard investments in foreign corporations. The provision offered in my measure was an exact copy of the laws of California and other states.

4. **Assess the costs and expenses of commission investigations to the utility under investigation.** This would place the commission on equal footing with the utility under investigation in regard to funds. At present, the rate payers provide the utility with funds without limit, which are expended under the direction of foreign holding companies to protect and defend the utility against curtailment of excessive rates and exorbitant charges, while the people's agency is strangled at the outset for lack of funds. The provision offered was taken bodily from the Wisconsin act.

5. **Supervision of securities.** This desperately-needed protection to investors would prevent another Foshay or Peirce debacle in the state. At present, the state approves securities, but gives the investor no protection.

6. **Control of holding companies and holding company fees.** This would enable the commission to eliminate exorbitant charges for management and other services, by enabling it to establish a just and fair figure for such services.

7. **Power of the commission to punish for contempt similar to circuit courts.** No authority with the power of subpoena and hearing can function properly unless it is fortified with the power to compel obedience to its orders. My own experience on the bench justifies the statement that any court would be defied constantly but for this power. As commissioner, witnesses have refused to testify on two occasions, which demonstrates the necessity of this request.

In my opinion, honest and efficient regulation is possible and practical under the aforementioned provisions. Private utilities should not charge more than the public can serve itself for and should earn no more than a fair return. If, through regulation, this cannot be accomplished within a reasonable period, then the sole answer to the problem is public ownership.

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Agency Relationship *a Suggested Development*

The Address of

A. G. Mott

Chief Engineer, California Railroad Commission

EVER since society has developed to a stage of having organized government, certain classes of activities carried on in the public interest have been recognized as functions of the state. Among such activities are public defense, public education, fire protection and sewage disposal, all of which now are most commonly handled as a direct governmental activity.

Other functions, such as the provision of gas, electric, water, telephone and transportation services, the public has chosen to delegate to private interests.

This action on the part of the public in no way affects the premise that such services are clothed with a public interest, and the courts of our land have for many years consistently recognized this fact. The relationship established when the public chooses to allow private interests to own and operate facilities which directly concern its welfare appears, in many respects, to bear a semblance to that between a principal and his agent, the principal being the public and the agent the utility. Actually, this agency theory is recognized in law and, in fact, to the extent that the law provides that a political unit may dismiss the agent and undertake the providing of public utility service which it may deem advisable or necessary. It is proposed here to examine the proposition that the greatest equity to all concerned can be obtained by carrying such a theory to its logical conclusion.

There are two phases of the relationship between the public and the utilities which must be considered in this regard. The first has to do with the regulation of the rates and services of the utilities under private management, and the second is the basis of changing from private ownership and management to public ownership and operation.

Next to the question of quality, sufficiency and safety of service, the most important aspect of the bond between the principal and his agent is the matter of compensation. For services rendered the public, the agent should be entitled to a compensation which would include all of his operating expenses, plus a fair return on the investment necessary to provide this service. This return should include both the actual cost of obtaining the necessary funds that have been invested, plus a reasonable profit that is commensurate with the risks incurred and the skill displayed by management in operation. Provision should be made for some basis of extra reward for unusual efficiency in rendering service.

The total costs on this basis would not be greatly different from those incurred under close regulation

based upon the prudent investment theory, except that under the practical application of the prudent investment theory, the speculative effect of changing land values customarily are included in the rate base and a reasonably-liberal margin of return is allowed over the cost of money to take care of risks due to the less stabilized basis of earnings. Under the agency theory, the only fixed item of cost would be the interest factor on the money actually invested in the property. Other costs, including materials and labor used in operation, would vary with economic conditions and with commodity and labor prices. Even lower costs could be obtained in the event the public chose to guarantee the security of the money which the investor would place in the utility. If that were done, the interest factor of cost would approach that obtained by the state.

Regulation under the agency theory would accomplish results desirable from both the public's and the management's standpoint. Rates could be changed more readily to reflect changing costs, and such controversial questions as rate base and fair value would be eliminated or at least reduced largely to an accounting mechanism. Accurate accounting under this plan would be absolutely essential. The investors would gain by having removed much of the speculative element that now surrounds public utility enterprises; their investment and earning position would be materially more stabilized.

The other phase of the relationship between the public and the utilities, arising out of the public's determination to enter directly into the field of public utility operation, would be even more simplified. Under present practice, where the public desires to acquire the properties of a utility through condemnation proceedings, the determination of fair value or just compensation is so illusive as to foster situations where the price fixed is so high that the community can better afford to parallel existing lines, with the attendant economic waste, rather than to pay the price fixed in condemnation. In other instances, the price fixed may be so low that the private investors suffer serious loss of their capital. Under the agency theory, the law should provide for the taking over of the properties by the public from the utility at actual cost, less the actual depreciation that the utility had collected through rates received for past services, this being the amount that the public had already paid for the property. For example: assume that a utility had invested $1,000,000 in its property and that it had properly accrued during the course of operation depreciation to the amount of 20 per cent. On a cost basis, $800,000 then would be the proper condemnation price. However, under present procedure, it might be that price levels at the time of condemnation had so fallen that the property could be reproduced new for $600,000, which, less the 20 per cent depreciation, would leave a condemnation price of $480,000. Under these conditions, the investors would suffer an uncompensated loss. If, on the other hand, price levels had gone up since the construction of the property to a point where the reproduction cost would have amounted to $1,500,000, the condemnation price, after deducting the 20 per cent depreciation, would be $1,200,000. In this case the investors would have had a large and unearned profit that never had been anticipated. In either case, under present procedure, the public may elect not to acquire the utility's property, but to parallel it with a new system, in which event both the public and the investors suffer because the available business must be spread over the duplicated facilities. A clear waste has been created. If the public were under the same mandate to purchase the utility's property as the utility is under to sell, and were actual cost made the basis of just compensation instead of reconstruction costs at current prices, a very important speculative element in utility business would be eliminated, the investors' capital would be protected, and lower returns would be justified, resulting in lower rates to the consumer.

A. G. MOTT

Another controversial point in condemnation proceedings is the question of severance damages. Under the present set-up, each political subdivision is a law unto itself and can take over the utility's functions for its own use at will. In reality, however, the utility is in effect the common agent for all of the communities which it serves. One community now has the power to injure others by severing a part of the utility's properties from the whole plant, thereby impairing the efficiency of the remainder of the utility's facilities. Compensation for this impairment is claimed by the utility in the form of severance damages, but the payment of such severance damages by one community does not mean that the remaining communities will necessarily receive the benefit of that payment. The remaining property is still in private ownership and, under the present legal concepts, entitled to full just compensation for its use. Furthermore, the very inclusion of severance damages may in itself place the condemnation price so high as to justify the municipality in refraining from taking the utility's property and resort to the alternative plan of over-building, in which event either the utility or the other communities served by it may be irreparably injured. To avert these unreasonable wastes and their attendant burdens upon innocent groups, the mechanics of condemnation should be so arranged that utilities' properties and obligations to serve would have to be acquired by the public affected in any district, namely, all of the communities and rural territory situated in the area served by the utility. Such public utility districts could be arranged so as practically to eliminate all severance damages.

It would appear that the real net effect of substituting the agency theory of regulation for the present private property concept would be to stabilize the utility industry and at all times leave the public in substantially the same position, both as to cost of service or cost of acquisition of the properties, as if it had elected to carry on these public utility services from the date they actually were commenced. The utility would get the benefit of a more stabilized position with speculation eliminated, and the public would be in a position to have more prompt adjustment of rates to reflect costs and would have the benefit of such lower costs as would flow from reduced risks incurred by the utility.

The Responsibility of Management

The Address of

Frank McLaughlin

President, Puget Sound Power & Light Company

THE PUBLIC utility industry has a very definite responsibility which it must stick to through thick and thin, through dark and sunny days alike, through times of prosperity and times of depression, through periods of appreciation for services rendered and periods of denunciations for sins, both fancied and real; and that responsibility is to render to the public a better service at lower rates than can be obtained in any other way. Only with such an objective, which must be lived up to, can the people we serve receive the maximum benefits to which they are entitled, can the investor expect the preservation of his savings or the employee be provided with the security of a job.

We are assured of a place in the sun only on the basis of the merit of our performance in discharging to the satisfaction of all concerned the obligations of a public trust. If we fail in this, it is inevitable that somebody else will take our place.

Of course, the doctrine of the best service at the lowest rates does not contemplate sacrificing employee or investor. All must recognize that, if this country is to continue to be a land of opportunity, labor and capital (invested savings) are worthy of their hire and have a place in the picture measured by their ability to contribute to the common good.

On all sides one hears the clamor for rate reductions. There are undoubtedly places where rates are too high. Electricity should be sold at the lowest possible rates. It would be poor business policy for a public utility to adopt any other course, because lower rates mean increased use and more benefits to the customer and greater security for the company. If, after paying fair wages to labor and capital, under existing conditions, a company is earning an excess income, then, of course, its rates must be reduced; but rate reductions which impoverish employee and investor should not be crammed down the throats of utility companies. Such a procedure upon the part of regulatory authorities can result only in adding to the distress which already exists. Confiscation of property through unjust legislation, unfair regulation and excessive taxation is destructive, not only from the standpoint of the servant, but of those served. Regardless of what one may deem to be the political expediency of it, posterity will recognize him as no hero who takes jobs from the worthy and destroys the earning capacity of both labor and capital. It should not be a case of robbing Peter to pay Paul. Rate reductions made at the expense of employee and investor are ill-gotten. I do not believe our customers want them on such a basis.

In these times of trouble and stress, when we are striving diligently to dig ourselves out of the depths of a devastating depression, all people should adopt a broad, constructive viewpoint toward the other fellow and whole-heartedly cooperate in a program to rebuild the purchasing power of the individual. Too often one hears the expression, "Well, I haven't got anything; I've lost everything—my job, my savings and even my shirt—why should anybody else have anything?" God forbid that the solution of our difficulties should come to mean that everybody should be "jobless" and "penniless."

It is particularly unfortunate that efforts should be made to crucify utility companies and impair their proper functioning at this time when the President of the United States is engaged in a program of inflation with the objective in mind of building back the purchasing power of our people, of saving homes and farms, of enabling debtors to pay off their mortgages on the same value of the dollar at which the debts were incurred.

Those who cry loudly for the last pound of flesh from utility companies should put themselves in the shoes of an employee or investor in such companies and adopt a program of doing unto others as they would have others do unto them.

Throughout the country today, public utilities are "on the spot." They are being bombarded from all corners with charges of high rates and watered stock. We are told that regulation has failed utterly and that the people have been robbed right and left. Some of the most radical even picture the utilities as the root of all evil. Insinuations and innuendos of one kind or another have been made, all calculated to inflame the public mind against private ownership and in favor of public ownership.

Now, there can be no doubt that the misdeeds of some within the industry have been stretched by the demagogue, in appeals to passion and prejudice, to brand the many, with the result that the confidence of the people in public utilities has been shattered. Certainly some within the industry, and it is more or less true of a few in all walks of life—victims of the greed ever present in our everyday lives, but always unbridled in boom days—have tried to "gild the dome" before digging the foundation, and have put the reverse English on the Rotary motto by adopting a policy of "He serves best who profits most." It may be that black crimes were committed by some and that they lost the ball in a morass of stock manipulation and political intrigue, but because there are crooks and robbers doesn't mean that all people are dishonest and public menaces; because mayors of some cities and others who hold high places in the body politic betray their public trust does not mean that all men in public life do it; one bad egg in a basket doesn't mean that all of them are bad. So it is with public utilities. Because some went "haywire"—trod the path of evil and failed to live up to their responsibilities—does not mean that all utilities did likewise. The great majority have stuck to their knitting during these troublous days, in an honest endeavor to live up to wholesome objectives.

It is regrettable that because some few enterprises in industry and banking fail to measure up to their obligations, suspicion should be cast upon all the rest. However, we must recognize that, just as mosquitoes breed in a swamp, agitators and howlers of discontent flourish in times of depression. They attempt to tear down what they cannot replace.

Regardless of the reasons for it, public opinion today is challenging the good faith, the sincerity of purpose and, in fact, the actual job which the utility companies have done and are doing. There is only one thing for us to do and that is to face the facts. Such utilities as fail to heed the voice of public opinion are adding fuel to the fire which eventually will destroy them. Let's meet the acid test by unimpeachable conduct and by laying all our cards on the table.

To listen to some of our critics, one would gather that the return of happy days was entirely dependent on rate reductions. Electricity as an item of expense is greatly exaggerated, the work which it does for a small cost minimized. If we gave electricity away it wouldn't help much in restoring prosperity. Those who are looking for an opportunity for everlasting glory might well tackle the question of taxation—a 10 per cent reduction in the annual cost of government per family would more than take care of the yearly electric bill of the average domestic customer of our company.

This is our Judgment Day, but we are not necessarily doomed. True, many utility companies have been sentenced as "guilty" before they have been given a chance to present their case in a jury trial, but we must make up our minds that all of us will have to submit to some persecution on the part of those who would like to destroy us, and rest on the merits of our case, honestly and fearlessly presented to the court of public opinion.

I am satisfied that people generally do not know what the utility companies have done to advance their welfare. They are going to decide our case; let's present it to them, each company taking the responsibility for submitting its own story. We have made mistakes, so let's admit it. We are human; we cannot be right all the time; we will do well to keep up a good average. Let's correct our mistakes; let's see to it that they don't happen again.

To the extent that public utilities are doing things which are not in the best interests of all concerned—customers, investors and employees—they should reform themselves or be reformed. However, the answer does not lie in regulation or legislation which will destroy the utilities; it does lie in regulation and legislation which will eliminate abuses and which will provide that:

The people served receive courteous, prompt, reliable and efficient service at the lowest possible rates.

Those who have put their hard-earned savings in the utility company shall have their savings protected.

The employes who labor for the success of the enterprise can be compensated justly for the work they do.

It is interesting to observe that some of those who expound at great length as to the failure of utility regulation sponsor legislation for the expansion of municipal operation completely lacking in regulatory provisions. If public regulation of private utilities has been such a miserable failure (and I do not believe this charge can be maintained), I have never been able to figure out how the customer would be benefited by public operation, which means complete domination by political bodies. It is just as logical to argue that a board of directors of a utility company constitutes an adequate regulatory authority.

The siren song of the advocate of public ownership is that the day of private operation of the utility is over, that only with public ownership can cheap rates be obtained and the rights of the people protected. The inference is that all is wrong with private operation and all is good with public ownership. Adherents of public ownership are seizing the present, when the utilities are under fire, as the psychological moment to selling their wares, and we must admit they are doing a pretty good job of it. However, a lot of their enticing and alluring boasts smack of the same elements of insidious propaganda for which the private companies have been condemned, and some day it will come back to haunt them in a like manner. Chickens do come home to roost.

I definitely believe that the people are entitled to know on the basis of the merits of actual performance whether private or public ownership best serves them. This means that all those engaged in the furnishing of electric light and power, whether municipal or private, should be taxed on the same basis, have the same accounting system and be under the same rules and regulations. Municipal plants should be stripped of their subsidies, their halos of saintliness. The efforts of self-seeking politicians who want to perpetuate themselves in office by the establishment of a political, public ownership empire, should be exposed to the sunlight. This is no time for pussyfooting. The people should know the whole truth about both public and private operation—and let the best man win. He will anyway, in the long run. It is only the things which are right and sound that endure.

It is true, we have many problems ahead of us. Cheap electricity has been made expensive by ever-mounting tax burdens. We are confronted with back-breaking legislation, stringent regulation, with demands for rate reductions in an era of inflation and with government in the power business on a large scale. We are in a battle and we cannot sit back in smug complacency and rest our cause on the theory of divine right. Final judgment must come from the people rather than from the courts. Public confidence must be restored. The solution of our difficulties does not rest with platitudes or palliatives; it does not rest with saying one thing and doing another. It means that we must practice what we preach and preach what we practice; it means that the reward for the work done must come only from the performance of a worth-while service.

People are not going to conclude right now that they are better off by turning one business after another over to the government to operate. It simply means doing by degrees what Russia did in one full swoop. A program of more government in business and still more government in business simply means that eventually nobody will be left to support the government. We would then all be cogs in a machine of destruction of individual rights and liberties. The solution of all problems today does not rest solely with government. This is the time when all of us must shoulder our responsibilities and not duck them, when we must put our houses in order to meet the changed conditions. The primary purpose of government is to protect and not to usurp the rights of its citizens.

We are here today because this wonderful western country was a land of opportunity to those great pioneers who conquered a wilderness with a rifle in one hand and an axe in the other. They left us a tradition to preserve; let's preserve it. By their courage, fortitude and right thinking, they overcame what appeared to be unsurmountable difficulties. In their achievements there is a soul stirring inspiration for the task that lies ahead. Let us all see to it that out of the ordeal through which we are passing there will emerge a better public service with greater benefits to the people served, and that we will supply it and be the benefactor because of our ability to do the best job. By our acts we will be judged.

Inspectors—Traffic Officers of the Industry

By F. D. Weber

NO USE to mince matters, the electrical inspector should receive more support from the electrical industry. There are a great many excellent ordinances, already statutes on the books, but the inspector dares not take a firm stand enforcing them because of the political pressure exerted against enforcement and the lack of a united electrical industry in the community back of him. I know from experience that almost 100 per cent efficiency can be obtained by an inspection department if it has a united local industry back of it.

Many of the inspector's troubles originate within the electrical industry itself. Unless the industry locally stands for efficient inspection, the public senses it and points out the lack of cooperation from the various units in the industry, becomes suspicious and refuses to abide by the ordinance. It is hopeless to expect the public to abide by an inspector's decision, or to an ordinance, no matter how expertly written, if the electrical family is not agreed on all subjects electrical. Seldom does anyone take exception to an electrical rule unless he is aided and abetted by someone in the industry.

Imagine the confusion, the hazard, the damage to property that would result if a traffic officer at a busy intersection failed to receive the backing and cooperation of the driving public. Failure to cooperate, in such a case, might hurt the officer but little, whereas it would do great harm and cause great confusion to those who really benefit by the officer's direction. Electrical inspection is similar, and the electrical inspector is in a position similar to that of the traffic officer. With the cooperation of the industry and public back of him, he can serve both. Without that cooperation there is confusion, damage, danger and loss to all.

A. R. Small, in a radio talk on inspection, defined the electrical inspector's job as follows: "— his duty is to detect and correct conditions in electrical work that may be dangerous to life or property from shock or fire."

Now, those are very broad duties. Are we inspectors to be orthodox in every respect and only endorse rules in the National Electrical Code which deal directly with fire and life hazards, or are we to be more liberal and include a few more rules which indirectly cause the same result and should be included if we are to render a more broadened service to the public? Any movement to better conditions generally is criticized, but unless the inspector adopts a policy which is in line with progress, he will not be filling his mission.

Inspectors, I am sure, need not fear criticisms that reasonable adequacy should be included in the code, since presumably adequacy should be sold by the industry. Within a very short time any adequacy specified by the code will fall far short of everyday practice. Then the question will be asked, "Why was not more adequacy required?"

We must remember that the industry is making astounding growth. Even today, the present total electrical market in all forms of power use is estimated at $2,501 millions, and potential markets are estimated at $6,980 millions. For the twenty-year period between 1910 and 1930 there has been a ten-fold growth in energy consumed and a nine-fold growth in revenue. In one of our Portland companies alone, consumption per domestic consumer grew from the 1910 figure of

of Portland, Ore., who, as president of the International Association of Electrical Inspectors, last year made an excellent address to its conventions throughout the country. From it he was invited to speak to this "Convention in Print" upon such portions of it as are of interest and value to the industry as a whole

252 kw.-hr., and 350 kw.-hr. in 1920, to 1,004 kw.-hr. in 1930. In the United States the increase in kw.-hr. consumed per domestic customer increased 40.9 per cent in the six years between 1925 to 1931. All things considered, the revenue from domestic use alone, despite reductions in rates, should double in the ten years between 1930 and 1940, depression or not. In the face of these facts of growth, who has the temerity to deny that adequacy provisions in the code are justified?

Every inspector should support his local inspectors' association. He should not drop his membership, even though his income is impaired. It is his own association, dealing with his own problems. The past record of the association for accomplishment is remarkable. Its influence on the National Electrical Code has been effective and constructive. In these accomplishments the individual inspector has a direct voice and influence. Only through a united effort of a majority of inspectors can electrical safety be accomplished for all the public.

Not only should inspectors support an association of this character, but so should the entire electrical fraternity. The inspector desires and needs the assistance of everyone in the electrical industry, for there is no one activity which bears more directly on the manufacturer, the wholesaler, the retailer, the contractor and the utility, than the rules of the National Electrical Code.

Inspectors and inspection departments at this time should study and put into operation reinspection of electrical installations for protection of the public. During the years when construction was active, it was a common excuse that the departments did not have time

to do this very necessary work. Supervision of new construction alone is not sufficient to eliminate fire and life hazards. To make a success of reinspection, inspectors should be especially qualified. They should be endowed with a winning personality and have unlimited patience with the public. This is much more of a selling job than the technical enforcement of an ordinance. The inspector must make the tenant or owner realize that, as a public servant, he desires to protect the latter's property and eliminate as far as possible all life and fire hazard.

Electrical departments should not be discouraged if reinspection work does not prove self-supporting from fees collected from such work. The time consumed in accomplishing the proper results is many times as great as the value of permits obtained. From the standpoint of safety and protection to the public, such work is well worth-while. That reinspection work can be effective has been proved in Portland, as reported in the last issue of ELECTRICAL WEST, p. 176.

Another matter becoming of more importance every day is that of retail sales or material ordinances. It does not matter how such ordinances are made effective and legal, but it does make a great deal of difference whether the inspection department is insistent on materials, apparatus, devices and equipment which are free from fire and life hazard.

During the past year a great many "rackets," especially in the manufacture of radio equipment, have given inspection departments much trouble in enforcing such retail ordinances. However, conditions are improving, and by the concerted efforts of several large cities in Pacific Coast states, better conditions will be attained. The same is true of refrigeration, where growth has been phenomenal, and where speeded production, new models and sales pressure often has sacrificed care in assembly and design and hence safety to the using public. The better manufacturers have been endeavoring to produce excellent machines, but competition has made several problems which need solution in order that undue restrictions shall not be placed upon the manufacturer, the wholesaler, the retailer and the public.

Do not become discouraged with the National Electrical Code, feeling that it is hopeless to expect it to become perfect. We still have the power to amend and clarify its meaning, and I urge inspectors to buckle down to hard work, aiding every article committee in so drafting the rules that they definitely will express what is desired. Codes are not new things, even in the building game. The world's oldest building code of record was a part of the great law code promulgated by Hammurabi, king of Babylon, for use in the courts of his empire more than 4,000 years ago. Unlike many a present-day code, there was no ambiguity about Hammurabi's. It was terse, and to the point. Hammurabi was apparently father of the safety first movement and the pioneer assailant of the jerry builder. For example:

"No. 229. If a builder build a house for a man and do not make construction firm, and the house which he has built collapse and cause the death of the owner of the house, that builder shall be put to death."

Our present building codes, including the National Fire Prevention Association code, have taken 302 years of effort to formulate and evolve and still are being rewritten and changed. As with the arts of electricity themselves, changes in technique and material require changes in regulation for safety. Our best hope ever should be to keep abreast of the development of the industry; if possible, a little ahead of it in adequacy provisions, but never behind it or a drag upon progress and a restriction upon the benefits which electricity brings to human comfort and labor.

Our 14 Points for Durable Industry Cooperation

By Lloyd Flatland

CONTRACTING sometimes is its own worst enemy. It is an individualistic game, practically the last that is so in these days of mergers, consolidations and regulated monopolies. Contracting still is unmergerable. It is hard to get its individualists who own their own businesses to work together on problems that only team work will solve. We have hope that President Roosevelt's program for industrial recovery, which sets aside the out-worn restrictions on business men getting together to set up rules of fair competition and have police power back of them, will bring us a means of doing for ourselves what most needs to be done right within contracting's own ranks.

But contracting also suffers from the sins of the other branches of the industry. It is hurt when the ethics and practices of the industry short circuit. Many of our problems are linked to supply—wholesalers and manufacturers. Some involve relations with the utilities. In bringing these failures to the attention of the industry, sometimes we have been accused of being critical, destructive, of offering no remedy. Accordingly, at a meeting called to outline our program to the industry not long ago, Mr. Martin read our definite, constructive challenge to the industry. I feel that it cannot be repeated too often or too emphatically. On behalf of the contracting branch of the industry, let me repeat it here again:

president of the Electrical Contractors' Association of Northern California (standing), who, with Edward Martin, secretary (seated, left), first presented these points to the industry at a San Francisco meeting

IN facing the future, the newly-reorganized Association of Electrical Contractors of Northern California sets itself to constructive, yet aggressive, accomplishment of fundamental improvements necessary to bring the electrical industry back to a plane of fair dealing, profitableness to all branches of the industry, and common sense.

In so doing it calls upon all **Electrical Contractors** to:

1. Put their own houses in order, which means to become better business men, unmoved by the blandishments either of false sales schemes or the falser race for jobs regardless of cost. It means considering the business as a business, not a gamble.

2. Analyze costs of doing business and make these analyses available to the industry so that there no longer can be any excuse for not recognizing these costs in the margins or discounts provided those who sell or install equipment.

3. Defend their own businesses and future by defending the industry against such outside rackets as foreign lamps and lighting equipment, trick gold-brick electrical products, gas engine substitution, and uneconomic municipal ownership schemes, which in the long run reflect discredit upon the industry and bring only temporary, if any, business advantage.

4. Recognize that this is an age of change; that processes as well as methods are undergoing great changes, and that it may be necessary to alter contracting to meet these new developments or conditions.

Because so many of the problems of contracting relate to manufacturer policy and sales methods, the association urges upon **Manufacturers** more consideration in the following respects:

5. Recognition of the ultimate soundness of supporting and making business profitable for a high-grade type of business contractor, so that there will be some incentive for contractors to meet the specifications of such a type in their own business conduct, and that new contractors, as business improvement warrants, will be recruited from men who can develop into good business men.

6. Margins and discounts be established on stable lines of merchandise or equipment based upon the true facts as to cost of distributing such products, and not guesswork or hope.

7. That distribution of their products be reasonably and intelligently restricted to the number consistent with the market; and furthermore, that consideration be given by them to their competitors, large or small, recognizing that they, too, must be allowed a share in the market. If they are not accorded that consideration, experience certainly proves that the competitors may take it upon themselves to break into such markets at the expense of the entire industry.

8. Arrival at some reasonable classification of trade and that consistency be followed to the extent of making the same classification for wholesalers whose operations are controlled by such manufacturers.

9. That a real analysis be made as to whether or not direct-selling really pays when it brings in its wake a demoralized contractor, wholesaler, price and quality situation and increases sales costs by duplicating and triplicating sales effort.

The association, in addition to the foregoing considerations asked of manufacturers, also urges upon **Wholesalers:**

10. A determination whether the future functioning of a wholesaler does not call for a decision as to the field and extent of wholesale distribution and its limitation so that it may be determined whether the wholesalers cannot re-establish themselves as the buyer and complete supply source for the contractor, becoming the agent of the contractor a little more and of the manufacturer less.

11. That jobber salesmen's activities be promotional and compensated for upon that basis, so that the temptation to sell direct now presented in their compensation scheme will be eliminated and that they can better fulfill their function as the advisor, buying agent, salesman and expert on a product which the contractor needs to help him in his sales and business development. As long as the contractor must consider the jobber salesman as his competitor, there is little hope that the jobber salesman can perform these really necessary functions for him. The great investment both of the manufacturer and the wholesale in advertising, sales promotion and personal-selling effort, cannot help but be checkmated by contractors in their own self-preservation as long as they are in a competitive position to those who should be allies.

To the **Central Stations,**

The contractors urge that the excellent policies enunciated by the officials and head offices as respect merchandising be given a better chance to find their way into actual practice by:

12. More careful consideration of the profitableness to cooperating dealers of some of the sales programs prepared by utilities. As it is, an unattractive sales program breeds disgust rather than a cooperative effort on the dealer's part. Utilities should realize that the business advantages under which they operate, where revenues from use can justify and render profitable even some losses on merchandise selling, are not available to dealers. This disparity of economic position gives rise to the dissatisfaction and rancor which has led in the past to anti-merchandising movements.

13. More consideration when work is to be done, as to the ultimate advantage of favoring those whose efforts in the industry are consistent with good service to the public. In other words, the ultimate economy of cheap wiring or of cheap contracting should really be studied as opposed to the value of the support of good substantial contractors.

Likewise, an effort should be made, where head office policy is basically fair and commendable, to see that this policy more often finds itself practiced in relation to salesmen's activities and district management attitude.

To the **Industry,** through the
Pacific Coast Electrical Bureau,

The contractors address this plea:

14. That the functions of each branch of the industry be better defined and understood, and that in campaigns, slogans, sales programs, Red Seal activity, or other work undertaken by the Bureau requiring industry and contractor participation, that the tests of profitableness and real and permanent value to the industry be considered. The Bureau officials have long deplored the lack of participation in its programs by contractors. Unfortunately, by such non-participation they have misjudged salesmanship or business qualifications of contractors. As this association conceives it, the Pacific Coast Electrical Bureau has before it an opportunity which it has never yet realized, that of becoming a genuine forum for industry problems, not as in the past merely the sales aspects of such problems, but the sound economical study into the problems and their consequences.

As the contractor goes, so goes the industry; if the contractor prospers, the rest of the industry prospers also.

Advertising and Its Immediate Job

The Address of

Al. C. Joy

Manager, Publicity and Advertising Departments, Pacific Gas and Electric Co.

PSYCHOLOGISTS have progressed far beyond their established first principle that living is a state of mind. Yet the truth of this principle has been demonstrated so conclusively in recent weeks that, for purposes of this discussion at least, it embodies all that we need to consider in the science of psychology.

Reaction to the condition of the times has been universally the same. Millions of persons have been unemployed and able to buy but little. Others whom the financial stringency touched but lightly, if at all, made a solemn virtue of economy. They cut down on their buying, and the result was decrease in circulation of money and increase in unemployment. The state of the public mind, influenced by fear, definitely intensified the depression.

Then came the new administration and the "New Deal." The president was given authority to inflate the currency, to assist agriculture, to decrease the gold content of the dollar, to start a great program of public works. Not one of these things has yet been done. But the mere knowledge, not that they were to be done, but that they could be done, started an immediate upswing in business. Prices began to climb, the stock market grew active and bullish, factories called idle hands back to the machines, people began to buy things they had been doing without. There was no physical reason for this; it was merely the changed state of the public mind. Subconsciously there was a new attitude—a feeling of confidence that once again all was well.

Recovery to a fair degree of prosperity cannot come through political or economic change alone. Far more important is a restoration of public confidence and a strengthening of business morale. And in promoting these factors of influence, no force can be more effective than advertising.

Advertising breeds confidence, not alone in concrete articles, but in abstract ideas. Business policies, political issues, candidacies for office, church services, education—these, too, are sold through advertising.

Why, then, should not advertising do its part in reconstructing public confidence—in bolstering public faith in recovery? More than ever before, that bolstering is needed now; needed because the public mind, after the travail and uncertainties of the past three years, wants now to believe. It wants to believe that the crisis is over, that conditions are better, that business definitely is improving. The seeds of confidence which it is advertising's opportunity to sow, will fall upon fertile ground. Constant repetition of the inference that better days are here will be like a rowel to the psychological reaction now in progress.

Repetition of the inference, I say, because in my opinion there is little value in the direct statement—in the ballyhoo of babbitry. Advertising has a more direct story of business improvement to be told by indirection. It is a straight business story, and should be told on the assumption that there is business to be had and that the advertiser determinedly is out to get it. It must be sincere, logical, forceful. It must have something definite to offer.

In the electrical industry we have a direct, sincere, logical story to tell. Never has there been better electrical merchandise than today. Never has there been better service. It may be that, even in electrical appliances, the depression brought some inferior merchandise into the markets. But this was not general; there was a steady striving for lower price, but there was also a steady striving for better quality. We have more to offer than ever before.

The utility is leading the way, trying to build markets in which the dealer, if he is on his toes, may sell his wares. The utility will continue its efforts to create prospects for the electric range.

In retail advertising, whether it be of the electric range, water heater, air heater, washing machine, ironer, vacuum cleaner or any other of the innumerable appliances making for the electrical emancipation of the women from household drudgery, the outstanding note should be a note of assurance. We must believe in what we are selling if we expect to make others believe in it. This is the quality merchandise that an enlightened, progressive, work-easing age demands. Such advertising by the very confidence it breathes, by its own unquestioning acceptance of improved conditions, will help to rebuild public confidence.

Business morale is not to be strengthened by Coueisms. That has been tried. In the darkest days we sought to exorcise the demons of depression by telling ourselves, "Things are getting better and better." But our own accounts and the steadily-lengthening breadlines proved otherwise. Merely saying that things are better is small-boy courage—whistling. There is nothing small-boyish in the job electrical industry advertising has to do. It is much more than a man's job—it is an industry job, and it is a job that requires cooperation and coordination.

This industry of ours has a big selling job, and it has, as far as we here are concerned, a great potential market, the whole Pacific Slope. If we do this job well, we will be promoting quick recovery. Every appliance sold means employment for somebody in the factory; it means profit for ourselves; it means more demand upon the central station for service; it means a nearer approach to the day when construction will start again, and when the idle men and women, trained in the electrical industry, will be back at work. This is, of course, a perfectly obvious exposition of the economic cycle; the more the people buy, the more money circulates, the shorter grows the breadline, the smaller grows the mortgage, the nearer we come to prosperity.

Into this picture the contribution of advertising can be sketched with broad stroke. Advertising that has a real message, advertising that helps in the movement of goods, advertising that breathes confidence and conviction, will strengthen business morale. True, we may all of us fall short of what we aspire to do. But there isn't any reason why we shouldn't try to do it. The signs of the uptrend are unmistakable. Let us who are in the electrical industry prove our own confidence in recovery, in our industry and in ourselves, by cooperating in sound advertising, by coordinating our advertising effort, by going after the business which we feel certain is now to be had.

Our Women Carry On

The Report of the Women's Committee, as It Would Be Conducted

By Jeannette I. Rees

Southern California Edison Co. Ltd., Chairman

THIS will have to be very much of an abbreviated report of the work actually done by the women's committee, I'm afraid. You gentlemen of the industry will have to be very intuitive, so that from the brief reports I am going to ask each girl to make on behalf of the committee which she has headed this year, you may glimpse some of its real significance and value. I wish there were time to outline our objectives and policies, but you will have to deduce these from the activities themselves. Our record must stand as the sole recommendation that the work continue in the future, if not on the intercompany scale of the association, at least within each company to the full extent of its individual resources, both in funds and personnel. I know from my experience that this work speaks eloquently for the women of the industry, for their loyalty and devotion to the true ideals of public service.

Marvel Murray, of Los Angeles Gas & Electric Corp., chairman of our speakers' bureau, will report first. What has our speakers' bureau accomplished, Mrs. Murray?

Mrs. Murray—I am proud to say that even since our magazine, "Public Utility Women," has been discontinued, the company committees have continued to report on talks given before women's clubs, civic centers, before school groups and on the radio. For the association year, our women have talked before 3,784 women, giving Mrs. Rees' illustrated lecture, "Electricity, Our Versatile Partner," twenty times, and the gas lecture, "Fires of Civilization," ten times. Many other talks on public utility subjects, particularly to farm women, and on the radio to the general public, also were given by girls of the utility companies.

Mrs. Rees—Now hear from the library bureau, Mrs. Mary Caroline Lynn, of San Diego Consolidated Gas & Electric Co.

Mrs. Lynn—The library bureau furnished a column of reference reading, important articles in various magazines and books affecting our industry, in each issue of "Public Utility Women." In many companies not having a regular library, the women's committee librarian is able to perform a voluntary service in this respect.

Mrs. Rees—Mrs. Verda Rarick, Southern California Edison Co. Ltd., will you tell us of the work of the home service bureau?

Mrs. Rarick—Many committees devoted one or two of their year's programs to demonstrations and direct study of electrical home equipment. In smaller groups there have been electrical dinners prepared by the girls themselves, thus giving them actual experience in using electrical cookery. As an evidence of the fine spirit actuating the girls in this service, I wish to say that these dinners have cost the company nothing, the entire expense being borne by the girls themselves. Such meetings often are held in the homes of the girls, sometimes in the offices or company kitchens. Many of our members have all-electric homes which are outstanding community advertisements of the desirability of this type of home equipment.

Mrs. Rees—We would like to hear from Ella Russell, of Coast Counties Gas & Electric Co., about safety and first-aid work.

Miss Russell—This bureau advocated at least one program a year in first-aid, calling upon the company first-aid supervisor, or local fire, police or Red Cross departments, to furnish speakers and demonstrations. Many committees conduct first-aid classes; several have regular teams. I might mention two typical instances of first-aid rendered by our members, one on the highway to injured motorists and another to a drowning boy at a beach.

Mrs. Rees—This year we started a new work, benevolences, under the chairmanship of past-president Nyra Letchworth, of San Joaquin Light & Power Corp.

Mrs. Letchworth—Many hundreds of homes were gladdened at Thanksgiving and Christmas time by the thoughtful benevolences of our women's committee on the coast. Several hundred baskets of food were given families in distress; toys, clothing, milk for children; dolls beautifully dressed by the girls for gifts to poor children. All of this was done with the personal touch, over and above gifts to organized charity. Many of our women took the lead in general company benevolences, in raising funds for community chests and the like.

Mrs. Rees—Time does not permit reports from our other chairmen, but I cannot conclude this session without tribute to these works. Under Lillian Broeker, of Pacific Gas and Electric Co., another new department on debates and dramatics produced nine original plays written by members of our committees, besides successful debates on government economy and taxes. Miss Ella Hoeft, of Southern California Edison Co. Ltd., was chairman of the publicity committee and was responsible, with the help of the girls in each company, in obtaining much favorable publicity, in placing magazine articles and newspaper accounts of committee work. Bertha Dale, of Pacific Gas and Electric Co., as chairman of the committee on relations with other clubs, not only holds office as president of the San Francisco Business and Professional Women's Club, but, working with the speakers' bureau, has done much good work in bringing better understanding between the club members and the utilities. I wish it were possible to name each committee member and relate her activity during the year, to tell of the fine work of the vice-chairman, Clydia Weems, and our secretary, Phyllis Rowan.

In the few moments left, let me mention all too briefly the following additional activities of our members: sponsoring general employee meetings to which wives of men employees were guests, promoting better understanding and acquaintanceship; acting as hostesses at company functions of official and unofficial character; sponsoring company social occasions; visiting company plants and those of customers using company service; studying languages to take care of foreign-speaking customers; studying election issues and candidates; studying the economics of the industry.

It is fitting, in closing, to pay tribute to those brave and devoted girls who were so faithful to their duty during the earthquakes in Southern California, carrying on for long, arduous hours and keeping their poise in a manner that amounted to heroism.

COMMERCIAL ROUND TABLE

THERE is no question that the work of our Sales or Commercial Sections is beneficial, is needed and is wanted. When it was announced at the recent Portland meeting that the Northwest Association was to continue, enthusiasm ran high. But many of us had agreed that, if it were decided to discontinue the association, it would be highly desirable, if not absolutely necessary, to form some kind of a group of commercial men for the consideration of those problems affecting us all in our day-to-day work with our companies.

Our reasons for this determination are several:

1. We need new ideas for sales plans, offers and load-development programs. An exchange will help to guide our individual efforts to gain maximum load-building efforts.

2. A certain amount of synchronization of these plans and programs is desirable in order that offers made by one company do not embarrass an adjacent company whose policies in that particular phase of commercial operation might differ. This can be brought about best by personal contact.

3. It is desirable that our relations with retail outlets throughout the territory be somewhat uniform; the exchange of information and the committee work of the Section have done much in this field.

4. There is need for cooperative study of products, selling methods, value of different types of load and similar subjects, and this is best done through committees and in committee reports.

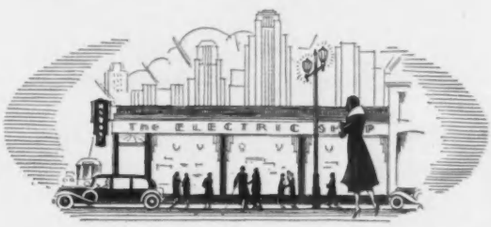
5. Self-education on new devices and new applications is desirable. A case in point is air conditioning, and a reference to the symposium on this subject offered at the last Sales Section meeting is an indication of the type of educational work done continually by the committees to keep commercial men and company executives informed on the new possibilities for load building by properly-applied promotional efforts.

L. W. BRAINARD,
Chairman, Sales Section,
Northwest Electric Light
and Power Assn.

IN THE DISCUSSIONS

Harry Carroll	*: Electrical Sales Manager, Pacific Gas and Electric Co., chairman.*
A.C. McMicken	*: General Sales Manager, Portland Electric Power Co.*
A.E. Holloway	*: Vice-President in Charge of Sales, San Diego Consolidated Gas and Electric Co.*
Lewis A. Lewis	*: Assistant General Manager, The Washington Water Power Co.*
W. L. Frost	*: Vice-President in Charge of Sales, Southern California Edison Co. Ltd.*
Pierre Vinet	*: New Business Manager, Coast Counties Gas and Electric Co.*
E. G. Stahl	*: Sales Manager, San Joaquin Light & Power Corp.*
H. C. Rice	*: Manager, Merchandise Department, Southern California Edison Co. Ltd.*
H.H. Courtright	*: President and Manager, Valley Electrical Supply Co., Fresno.*

Dealer Relations



Question: What progress has been made in the past year in bringing about a better mutual understanding between utilities and dealers?

MR. CARROLL: In spite of the recent drastic action of the Oregon commissioner, which would appear to be a direct effort to put the utilities out of business, I wonder if the general reaction from dealers everywhere last year is still their attitude toward utility merchandising today? Not a company that I know of but has tried hard to eliminate all of the sources of misunderstanding; some of us, I'm afraid, leaning so far backward that we have almost crippled our business. I know in our own case we have developed our dealer help in advertising and in cooperative shows and compaigns greatly, and I feel that on the whole dealers in our territories are much happier about our merchandising than a year ago. What do you men find?

Mr. Lewis: As chairman of the dealer relations committee of the Northwest Electric Light and Power Association, I have had the opportunity of visiting a large number of dealers and it is my opinion that the feeling among dealers toward utility merchandising is far healthier than it was a few years ago, brought about principally by realization that our company representatives were not as close in touch with their dealers as they should have been, and it was lack of confidence which depreciated to a very large extent the efforts that were being put forth to encourage dealer sales.

It was a surprising thing to me to find that nearly all of the objections to utility merchandising were either based on historical facts much out of date, or that many happened at some distant point or did not pertain to merchandising at all, but had to do with utility practice in general, most of which was misunderstood.

Today utilities are studying load building from the dealers' standpoint more than ever before, and while actively selling, themselves, are doing it on a basis that any active dealer can follow at a profit. Merchandising policies are being printed and placed in the hands of dealers and an effort is made to work out load building together instead of separately.

Mr. Vinet: Frankly, I feel that if a more or less uniform policy were adopted by the power companies, in cooperation with manufacturers and contractors and dealers, that an attractive and progressive utility merchandising program could be worked out to the satisfaction of everyone affected. We really feel that the dealer relations department has paved the way for such an arrangement, and if and when another electric convention is held here in the West, practically the entire time should be given to the discussion of the

subject and the matter brought to a very definite understanding. Members of all branches of the industry should be invited to present their sides of the picture in a constructive manner and a board of judges, or so-called jury, selected from the various groups to boil it down into a workable plan. In my opinion that is the only solution and the logical one, and I feel it can be done.

Mr. Carroll: As one of the victims of Commissioner Thomas' order separating all merchandising activities from regular company affairs, even employee tips, I presume, Mr. McMicken, what is your opinion?

Mr. McMicken: Quite frankly, sometimes my thoughts on the subject would not pour any oil on the troubled waters. You won't blame me, when you realize that when a proposed bill was brought up before our Oregon legislature and studied in committee, dealers from all over the state came to our assistance and showed how really valuable our merchandising efforts were, despite the fact that we do sell an appreciable amount of merchandise. As the result, the bill was never reported out of committee. And then came the commission order; well, let's get back to the subject in hand.

While I know there has been marked improvement in dealer relations and a better mutual understanding of the merchandising problem, many retail outlets still feel that the utilities should not merchandise and are unwilling to see that the building of load and revenue is an integral and very necessary part of the utilities' business, particularly in this time of depression. Why, witness the recent announcement of the Hydro-Electric Power Commission of Ontario to furnish and install free of charge electric water heaters, made to all customers in an effort to recover at least 40,000 hp. of load lost through industrial inactivity.

It is hard for the privately-owned utility to understand why it should not have the same right as any other business to use any legitimate method to build its load and revenue. While many dealers now recognize that their business in both major and small electrical appliances is definitely stimulated by aggressive promotional and selling activity on the part of the utility, many still want the utility out of merchandising, either because they feel that this business will fall into their laps or because they desire to divert into other lines of merchandise that portion of the consumers' dollar now invested in utility merchandise.

One of our Northwest utilities has been able definitely to answer the charges made that its retail stores sold the vast majority of electrical equipment going into the home, from incandescent lamps to electric ranges. It completed a very exhaustive survey covering all sales by it and all of the principal dealers in its territory for the year 1932. Statements had been made publicly that the utility was doing approximately 80 per cent of the total dollar volume of domestic merchandise sales and that dealers of all kinds approximately 20 per cent. The survey proved conclusively that 80 per cent of the total dollar volume was done by the dealers, and only 20 per cent by the utility's various stores.

This finding materially reduced dealer opposition to utility merchandising in this territory. Were the fact generally known that no major utility on the coast sells at retail more than 20 per cent of the dollar volume of incandescent lamps, lamp socket appliances and major appliances sold in the territory, no doubt some of the opposition to utility merchandising would disappear.

A Manufacturer: Surely that utility sold more than 20 per cent of the major appliances, Mr. McMicken?

Mr. McMicken: It is quite true that in electric ranges and water heaters, utilities may sell more of the total dollar volume, but in other appliances utilities sell but a small percentage of the total, and the net result is that for all sales the utilities' volume probably will not exceed 20 per cent in dollars. This being the case, it would seem possible to interest dealers, who sell chiefly small domestic appliances, so that they would encourage the utility to promote and sell small appliances at prices and on terms which dealers can meet and thus help revive the small appliance business.

The utility must be allowed to sell in fair and open competition in order to defray at least in part the expense of the advertising and promotional work necessary to stimulate dealer sales. At this time, in particular, few utility companies have the money to spend solely in the promotion of appliance sales for dealers, no matter how altruistically inclined the management may be.

Mr. Carroll: As both dealer and utility merchandise subsidiary, "Kelly," won't you sum up this discussion in a few practical principles?

Mr. Courtright: We feel that it is vital to the progress of our industry, our entire industry, that the utility continue to merchandise. This merchandising should embrace the pioneering of electrical products, the building up of the present retail outlets into more efficient sales organizations, and the setting of a high standard for quality in the products introduced into the homes of consumers. The field is broad. As the utility assumes this leadership in a forceful, yet sympathetic manner, and conducts its merchandising of the products consuming its energy along sound, constructive, ethical merchandising lines, on a live-and-let-live basis, it can and will receive the good will and aggressive cooperation of the dealers.

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Appliances

Question: How shall we stimulate the appliance business (ranges, refrigerators)? . . . Why not a Laundry Equipment Bureau? . . . How can we resurrect the small appliances?

MR. CARROLL: Our next concern is the appliance market. During the past three years, appliances have been the life savers of the business. Our problem today is: How to keep the market stimulated; how to revive the sale of small appliances, which seem to have had a decided slump during the past year; as well as how to continue with the major appliances, the range, the water heater, the air heater, the refrigerator. Since our range council and our Refrigeration Bureau have proved so successful in organizing those who sell such appliances into a cooperative and hard-hitting sales army, wouldn't it be a good thing for us to develop a laundry equipment bureau along similar lines?

Mr. Rice: The Electric Cookery Council has a well-developed plan, but is running into considerable difficulty in increasing sales volume, due to the lack of interest of the public and falling off of field promotional effort by utilities and manufacturers. All national advertising must be supplemented by local and personalized demonstrations, if electrical cookery is to be sold in volume; otherwise it remains as a desirable thing to be obtained when the prospect's ship comes in.

At the present time, in southern California at least, there is no direct selling effort in the field whatever, outside of the utilities, and that effort has been so curtailed during the past two years that public interest is at low ebb. It could be revived by a strenuous and well-directed campaign, and no doubt will be. Most people are making their old equipment serve until such time as

they feel safe in committing themselves to any purchases. This applies to other types of cooking equipment as well as to electrical. However, most of the range manufacturers have not kept pace with the developments their competitors have made in redesigning their ranges and modernizing them to conform with new ideas in cooking equipment.

Mr. Carroll: Many localities seem to combine the work of the range and refrigeration bureaus. What are your thoughts on refrigeration?

Mr. Rice: Electrical refrigeration apparently is settling down to the survival of the fittest, and the fight from now on will be between the larger manufacturers whose facilities for research and development are such that they can constantly improve their product and lower prices, with the result that the public is going to benefit. High-grade refrigerators today are so far ahead of those of two or three years ago that there is no comparison. I anticipate still further improvements. With approximately 17 per cent of the families now using electrical refrigeration, the market is just getting under way. I think the percentage will be doubled in the next two or three years at the most.

Mr. Lewis: Roger Babson gave us a text, "We must sell ourselves out of the depression," and it is evident from the interest shown here this morning that we are going to do just this thing. We must admit that for many years past much of our electric load just grew up without a great deal of effort on our part, and now we find that some of that load is beginning to slip away from us without any definite plans to compensate for it. Electric Cookery Councils, Refrigeration Bureaus and new schemes for hot water heating are in the program, and while many companies with decreased revenues might find it difficult to finance these programs, in view of the diminishing returns, there is a decided feeling in the minds of executives that such programs are necessary. Electric ranges, water heaters, heavy-duty cooking equipment, air conditioning and electric ironers are still in the developmental period, and unless actively pushed beyond usual methods, we cannot expect the load to grow by depending on the dealer only.

Mr. Holloway: As far as the Refrigeration Bureau is concerned, we have been very active in forming one in San Diego. It has been operating for about two years and employs a permanent active secretary devoting his entire time to the development of refrigeration business in the territory. This bureau holds regular monthly meetings, has a complete organization, and carries on cooperative advertising. About four times each year a complete newspaper spread is made in which all refrigeration outlets cooperate. Our dealers are very active, and are doing a wonderfully fine job. We are lending them every assistance possible and find that they respond readily to any plan which will improve the sale of electric refrigeration.

Mr. Frost: While Mr. Rice just gave us some very pertinent thoughts regarding the possibilities of both these appliances, he did not outline what we are doing to promote them. I want to assure you that we are very active in promoting the work of both the National Cookery Council and the National Refrigeration Bureau, recognizing in these two activities definite load building helps. The program of the Cookery Council has been confined largely to promotional work in our territory, and the actual building up of the sales effort only just now is taking effect. The local activity of the Refrigeration Bureau is bearing fruit. Programs for the local refrigeration group for 1933 are being formulated now. Close tie-ins with the splendid sales helps which practically all the manufacturers of electrical refrigerators have started, should produce real sales results. We are extremely optimistic about furthering the refrigeration load during the present year.

Mr. Courtright: Very naturally, we have been very close to the activities of the Refrigeration Bureau. I feel that its activity has been a vital factor in the acceptance that has been gained for electric refrigeration. As a cooperative, promotional activity, it is without precedent or parallel in our industry. Its outstanding success makes us all confident that the National Cookery Council will be as worthwhile and productive.

Two ideas which should be popularized by the utility, I feel, are completely-equipped electrical kitchens, and electrical laundries. These two home activities lend themselves to complete electrical installation fully as easily as the bathroom lends itself to a complete plumbing installation. Properly promoted, these two ideas can become vital forces in the sale of major electrical appliances during the next few years. Anything that can be done to further them should be done.

Mr. Vinet: It is my belief also that a laundry equipment bureau is something worth a great deal of consideration immediately. Five years ago I personally had the experience of conducting a series of laundry schools in which, of course, we featured washers, ironers, water heaters, drying equipment and the like. These schools were conducted in two sections, one for the housewife and one for the housemaid. The results were very gratifying both from an attendance and sales standpoint, so I feel that a bureau to study the laundry equipment situation might be worthwhile.

Mr. Rice: Home laundry equipment has enjoyed a very good sale during the depression because it is a depression item. The laundry equipment manufacturers and dealers will have to give careful thought to their selling methods and their product if they are to improve their sales with the return of better times, however, as women have a natural antipathy toward doing their own laundry even with the modern equipment.

Home laundry equipment can be taken out of its present classification of what I term "alley business" and brought up on the main street. Trade practices of the past, where dealers were allowing salesmen to buy "jaloppies" and "bojacks" from second-hand dealers and giving them to the customers for trade-ins, has demoralized the washing machine business tremendously. There is no excuse for this practice and the best interests of the industry will be served by stopping it at once.

A second serious draw-back to the public, and one I believe can be stopped, is the matter of giving home demonstrations. In my opinion, the demonstration should not be given until the down payment has been made and the contract signed for the machine. If, on giving a demonstration, the machine is not satisfactory, then the contract can be cancelled. But the practice of the salesman placing a unit in the home and leaving it there for a month, in some cases, certainly is not good business. A home laundry equipment bureau, consisting of the controlling factors in the business, could have a very beneficial influence on the business.

Mr. Carroll: Our one experience in this line, the holding of a cooperative ironer campaign, certainly proved to us the possibilities of an organized laundry equipment industry. Not merchandising these appliances ourselves, we have hoped that the men in that field would take the cue from the Refrigeration Bureau and initiate such a program. Perhaps they will now. Our refrigeration activities have been along the same lines, for we merchandise none of these ourselves either. Yet our Northern California Electrical Refrigeration Bureau is just now going into its fourth yearly spring drive, with 52 radio broadcasts on two stations. A very effective campaign is planned. Each week a new booklet with menus for that week will be offered to housewives if they call at a refrigeration dealer for it. It will contain costs of the menus, with and without electric refrigeration, and on the back carry the advertisement of the participating dealer. Since a new booklet is offered each week, she must call each week for the new booklet, either to the same or to another dealer. This, we feel, will develop the live prospects, stimulate looking at the boxes on display, and make real business.

But we must hurry on to our old friends and early day companions, the small appliances, table appliances, whose health seems to be bad these days. What are we to do about them?

Mr. Courtright: To resurrect small appliance business, we believe that the utility again must lead the way. We are attempting to do this over our own system by arranging an advertising and display service for our small appliance dealers. This activity is carried on by sending a trained display man into each

dealer's store. This man is equipped so that he can arrange dealers' window and store displays, write show cards for them and keep them supplied with direct mail and promotional literature. In addition he is so trained that he can advise in, and if necessary, arrange the writing of dealer advertisements. In this way we feel that the utility can stimulate properly-arranged and lighted displays of small appliances, both in the store interior and in the show windows of the merchants' stores. This is vital, since goods cannot be sold unless they are properly displayed. The utility must assume this responsibility if it is to be done at this time, as the manufacturers and wholesalers have withdrawn much of their promotional efforts from the field.

Mr. Carroll: While we have not been ready to go quite that far, we are planning to extend our window display service to dealers for a cooperative, two-week display in each of our districts. We plan to call it a "five-cent" display, advertise it as such and then, by means of the display, show how much service from each appliance can be bought for five cents' worth of electricity. We do not merchandise these appliances ourselves, so will call upon all dealers to cooperate with us in exhibiting appliances.

Mr. Lewis: Small appliance selling seems to me to have passed out of the central station sales set-up, some companies discontinuing their stocks entirely and others carrying merely a sample stock with no effort back of its sales, leaving that entirely to the dealer. What effect this will have on the output is questionable, but it is my opinion that more appliances will be put out by the dealers than could be put out by the central stations alone, were they to continue their special-price campaigns eliminating the dealer from the picture.

Mr. McMicken: I can't agree. During the past year or more in an effort to help dealer outlets, many utility companies have confined their activity to the promotion and sale of major domestic appliances either by ceasing to sell small appliances entirely or by confining the sale of small appliances to over-the-counter selling, with the result that the small domestic appliance business has gone to "pot" for all outlets, because without the utilities' advertising and promotional selling, dealer outlets generally have been unable to afford the necessary advertising and promotion to keep these appliances prominently before the buying public. The problem of how the utility is to increase its domestic energy sales by bringing back both small appliances and major appliance acceptance and at the same time have the cooperation of all good dealer outlets is still an unsolved problem for us.

Mr. Vinet: I agree with Mr. McMicken, yet I can't see that there is anything tangible that the utilities can or should do towards resurrecting the small appliance business. I make this statement for the reason that a utility merchandises for purposes of load building. This point always is thrown up to us first by electric appliance dealers. There are very few small appliances which can be rated as major load builders. It falls upon the merchandising department of the power company, therefore, to encourage in every way possible manufacturers of small appliances to stimulate sales in campaigns through legitimate appliance dealers.

Mr. Frost: We do not take so hopeless a stand. It is true that small appliances, with one or two outstanding exceptions, have been a drug on the market for approximately ten years. Any effort to popularize and to move this type of merchandise in large quantities must be preceded by a careful study of consumer demand. This I believe is very clearly evidenced by the tremendous demand which has developed in the last year or so for the kitchen mixing type of appliance. The older types of small appliances, with the exception of the iron, which of course is a steady bread-and-butter item, apparently have lost favor with the general public and are going to require a renewal of public acceptance to bring up their sales. As a utility, we intend to carry on a general program for the larger acceptance of electricity in the home, its convenience, its economy and its ready helpfulness. We believe that this type of program is fundamental to the development of a consumer acceptance of the small appliance. Our advertising program has been modified to meet existing conditions, but every effort is being put forth to make every advertising dollar do a full dollar's worth of advertising.

Mr. Carroll: In other words, at present dollar buying power, Mr. Frost. So far, no one has said anything about the influence of styling and redesign upon the future of appliance sales. I know that "Bud" Rice has given this subject much study. Will you conclude this portion of our round table conference discussion with such a thought?

Mr. Rice: Well, I still believe that manufacturers as a whole are lacking in initiative in failing to present to the trade and to the public new designs and new applications for home and table appliances. The unit price on such appliances has remained practically stationary in the past two years in the face of lowered commodity prices on everything else. Only recently have we had some stirrings among manufacturers in redesigning irons, with the advent of the light-weight iron with automatic control, and corresponding reductions in price.

The same attention paid to the other items in the line should produce equally good results. You will recall we suggested a new design of a direct-reading clock at the conference two years ago, and only this year was the clock placed on the market. But for some unaccountable reason it was placed in a rectangular box, copied from our best design of ten-cent salt packages or perhaps from the latest packaging of corn flakes. The opportunity was presented to bring out an entirely different, unusual, unique design of an appliance that would have developed an entirely new outlet for clocks.

With the economic barometer headed upward, we can look forward to reviving interest on the part of the public in things electrical. A little initiative and well-organized promotion set off at the right time will produce undreamed of business.

Competitive Power

Question: What are the competitive power aspects—in industrials?—in agriculture? . . . How about demand rates?

MR. CARROLL: Speaking informally with several of the Northwest delegates, I find that this question of competitive power, particularly in agriculture, and its related problems, as to the form of rates for this class of service, is chiefly a California problem, because of abundant cheap oil and natural gas, and also because of our large agricultural pumping installations. On our own system, we lose some business to the gas engine, and then after a while we get it back again. The customer just seems to get mad at us and our rates in a blind desperation and no reasoning will change his mind. Then he gets an engine, tries it and soon tires of it, and comes back to get his motor hooked up again. With the big industrial and commercial loads the thing is more serious, naturally, because once an investment of considerable size

is made for competitive power, no industrial plant is going to drop it until it is worn out. But it is strange, too, that during the time when we have lost some such load, we have taken on new load from big commercial and industrial customers who have been running their own plants for a long time.

One thing is certain; we must not fool ourselves but that we are going to be in hard competition with other fuels from now on, that we must be alert continually to improve efficiencies of design and operation so that we can keep ahead of the economics of the situation. We can't sleep a minute on the job.

No section that I know of has such a problem as that in the agricultural areas. Mr. Stahl should be able to state the problem there in the light of almost too personal experience.

Mr. Stahl: In our San Joaquin territory there are three principal causes of the present competitive power situation as applied to agriculture: 1) agriculturists' buying power reduced below that of other business; 2) present low cost of diesel engines and fuel oil and the fact that lack of industrial development has forced engine manufacturing companies to look to agriculture for their markets; 3) the prevailing idea among farmers and others that the potential supply of natural gas at Kettleman Hills should make this gas available for agricultural pumping at an extremely low rate. It goes without saying that at the same total operating cost, agriculturalists would prefer the electric pumping plant to the internal combustion engine.

From an engineering standpoint this competition divides itself into three general groups: 1) The short-season user (20 per cent load factor or less) competitive with second-hand converted gasoline and automobile engines, which effect in many cases a slight saving if the farmer's time is not taken into consideration and the continuity of service is not important. The loss of this business may be considered temporary and in many cases has resulted from shut-offs, due to inability to pay power bills; 2) Load factors ranging from 20 to 60 per cent (this class covers the greatest majority of the utility's agricultural load). Here the utility definitely has the advantage of both old and new installations. If the decision is based on engineering facts, the business should be retained; 3) High load factor business (over 60 per cent). Most of this business includes the better type of farmer who is willing to pay a small premium for the advantages of electric service. These advantages offset the claims of lower cost made by engine manufacturers, but it takes selling to make these advantages apparent in the face of so-called analyses made on behalf of engines.

I think that we may expect this competitive agitation to slow down somewhat with an improvement in farm prices. In the meantime, however, the utility owes the farmer a duty to exert every effort to see that no action is taken without a careful engineering analysis with all facts and figure available for comparison.

Mr. Vinet: It will be particularly interesting to the electrical men to know that we are converting most of the gasoline engines and old automobile engines in our territory to operate with natural gas.

Mr. Carroll: I would call that poetic justice, but that is an ace in the hole which only the combination companies can have.

Mr. Frost: The competition which we feel from the old worn-out automobile engine is not considered particularly threatening. The amount of tinkering, work and care which this type of installation demands of its user will tend to eliminate it in the normal course of events.

Mr. Vinet: There has been a very noticeable change in business conditions in our agricultural areas. Farmers have been in the position in which they have practically no say-so about the financial condition of their property and have not been able to invest any money in new equipment. In many cases they have not been able to meet power bills. In spite of these conditions, they have had to continue operating in the best way possible. Other forms of power seem to be much less of a threat at the present time than was anticipated last summer. This is particularly true of diesel power. Even if power users could be convinced that savings could be effected by substitution of engines for electric power, they have no money to make the change. In most cases where engines have replaced electric power, second-hand equipment has been used. We cannot consider this as a serious form of competition. As conditions improve, some of these installations undoubtedly will swing back to electric service.

Mr. Holloway: We find more discussion today on the cost of generating power and lighting service in various institutions. The management of these businesses are taking a greater interest in determining whether or not they are getting full value for dollars expended in this service. Many of these cases have come to our attention lately and it has given us an opportunity which we have not had before to approach our customers and to show them the actual saving which they are making through the purchase of service from the central station.

We find customers now are willing to take time to go definitely into the various items making up the cost of generating their own kilowatt-hours. We find that the customer will not make any rash expenditures for new generating equipment or go into the business of generating his own energy himself if all the facts are properly presented.

Mr. Frost: The competitive power situation, which long has been with us, has become aggravated to a high degree by the economic and mental conditions of our consumers. Rates, of course, mean more to the consumer during such times as we have been passing through than they do in good times, and many of our customers have become acutely rate-conscious during the past few years. In many cases, this rate consciousness has developed to almost fanatical proportions on the part of large groups of consumers. Our problem, of course, is to do two things: first, to be absolutely certain that our rate structure is as fair and equitable to all parties concerned as it is possible for it to be; and, second, to eliminate from our costs of operation all possible unnecessary items, if there are any such. When all factors are taken into consideration, the cost of operating an electric motor on our system is less than the cost of doing the same amount of work by either a diesel or a gas engine. Unfortunately, we are not always talking to a strictly neutral audience and all of the facts are not always presented in their true light.

Mr. Carroll: That leads us directly into the subject of rates. What do you feel should be done, if anything, about the form of rates, of demand rates in particular?

Mr. Stahl: There is a great amount of agitation for lower rates at the present time. Some of this is due to an earnest desire or necessity on the part of the farmer or the industrial manager to lower his production costs. Many of the meetings where some of the loudest talking has been done and some of the most extravagant statements have been made, have been merely a "racket," in some cases promoted by shyster lawyers and publicity-seeking politicians who are taking this opportunity to secure the publicity which they hope will be profitable to them in the future.

I believe the demand form of agricultural rate is the fairest rate that has yet been devised. A general reduction in agricultural power rates certainly cannot be warranted from an earning standpoint. I think, however, that some thought and study should be given to a "dump power rate" during the months of April, May and June. Hydro plants, during this period, usually are not loaded to capacity and water is running over the dam.

Mr. Frost: Our rate structure, as I said before, is under fire from many angles. This we feel is a concomitant part of the depression psychology. Certain groups express a desire to have us eliminate the demand charge from our rates. When it is explained that there is an alternate type of rate possible for them to operate under, it then develops that, as a matter of fact, it is not the demand charge which is under fire, but the actual amount of money which the consumer must pay each year to the electric company.

During the past ten years we have put into effect ten major rate reductions, which have been accepted largely by consumers' groups without any thought of their significance. The put-

ting into effect of this large number of major rate reductions makes it extremely difficult for us to attempt to meet an emotional cry for lower rates, brought on by depression conditions. These rate reductions amount annually at the present rate of consumption to more than $11,000,000.

We believe that the agricultural situation in particular will not be met by any possible rate change which we might make. It has been said that were we to give the power away, the agriculturalist would still be in too deep to be able to break even. Nothing is going to correct that condition until the price of farm products has moved up to a basis that will return the farmer some slight profit for his investment and his effort.

Mr. Vinet: There is a general feeling among our agricultural consumers, particularly the prune growers, that our rates are too high and should be reduced in line with other commodities. Our management does not feel that this is possible. The principal objection found to our rates, as Mr. Frost has said, is with the demand charge. Many farmers say that they are satisfied with the energy charges and would even be willing to pay higher costs, but feel that the demand charge is excessive and object particularly to the fact that they pay demand charges at a time when they are not pumping. A form of minimum rate has been worked out to assist in smoothing out this difficulty.

Mr. Frost: On the whole, I feel that our industry is going through the same process that a convalescent person goes through following a long, serious spell of illness. The three years of depression through which we have been passing has left its mark upon us in the form of aggravated symptoms of conditions which have been long with us and new troubles which have developed during the depression era. This convalescent period will leave our industry in better shape to carry on constructively than it has ever been in before.

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Lighting

Question: Lighting . . . What of the rackets? . . . How can we regain street lighting load? . . . Home lighting—is it hopeless or really salable?

MR. CARROLL: Lighting, on the whole, has been freer from the effects of reverse thinking on the part of the public than any of our other types of business. Yet it too, has not been free from forms of competition and of curtailment that are new to this period. We have seen lighting "rackets" spring up, shyster lighting schemes. We have seen communities curtail street lighting at the expense of public safety. Home lighting, on the other hand, has continued to be our basic domestic load. What have been your experiences in these matters?

Mr. Frost: Depression conditions have hit us in our lighting field in the form of "something-for-nothing" lighting rackets which certain fly-by-night individuals are promoting. Our program in handling these is to keep as closely in touch with our consumers, particularly our large lighting consumers, as is possible, and to carry on a general educational campaign through our employees who contact consumers. The so-called pirate lighting programs cannot stand up under close scrutiny. It is our business to turn the bright and enlightening light of information on these outlaw operations which are costing our consumers real money and giving them nothing in return.

As for street lighting, every effort is being made to help our municipalities and street lighting districts to economize insofar as it is possible to do so without jeopardizing the safety of life and property. It is a nice problem and requires continuous constructive effort. To date, we have been rather successful in meeting the problem, however, and are hopeful that we can carry on without any serious upsetting of this most essential form of public service.

Mr. Holloway: We are assuming, of course, that most communities have curtailed somewhat in their street lighting in order to reduce taxes. How this reduction has affected safety depends largely upon the quality of street lighting before the reduction was made. In many cases street lighting was so very inadequate from the safety standpoint that the further reduction did not make much difference. Also, much of the reduction in street lighting was made in locations where lighting was not of the correct type for present safety requirements. In other cases it was made where property involved could not stand the assessments for the lighting costs; at least, that is my viewpoint.

For instance, much lighting was largely for advertising purposes in new subdivisions that were put on the market in 1928 and 1929. This load will return when the property again begins to move, and nothing can be done about it until that does occur.

Where certain lights on ornamental standards have been discontinued and the glassware removed, these will be replaced in most cases just as soon as conditions become relieved, if we are on the job to urge it. Where street lighting has been replaced by smaller units, the task of restoring larger units will be much more difficult. In many cases, depending upon the adequacy of the smaller units, the larger lamps will not be replaced for many years. Additional funds will be spent on additional lights rather than increasing lamp size.

As an industry we have a definite job in street lighting to perform, and that is the lighting of our highways. When this is accomplished we will set an example for our communities to follow. We will set up a contrast, if the job is done right, that will bring back street lighting on an economic basis and that will increase safety manifold. We cannot just wait for these conditions to occur. We must be in the front line continually to pick up the crumbs as they are dropped; we cannot expect full loaves for some time.

Mr. Vinet: Your question concerning street lighting is particularly interesting, especially in the way you put it; namely, "What to do to return this load." My answer is that there is nothing to do as it will come back automatically. I can state safely that every one of our communities were obliged for a short period of time to curtail their street lighting, which now nearly all is returned to normal, not necessarily due to the wish of those responsible for the curtailment, but because of a demand upon the part of the general public. Our company was asked on numerous occasions how to curtail street lighting, and, frankly, we gave it serious consideration and gave them our advice in the matter. In most cases this was followed. In some towns the lights were staggered, in others the candle power was reduced. It wasn't long thereafter that the public demand had the city officials turn all the lights back on. Our thought, therefore, is that we should work with the communities in trying to effect some savings by the curtailment of light. Where the power company may lose a little revenue temporarily, it will be quickly regained and better relations will be enjoyed by everyone concerned.

Mr. Carroll: No one has touched upon domestic lighting, possibly because few companies out West here are as active as we are in this field. Yet we feel from actual experience and persistent selling effort, that no matter how hard this field seems to be to develop that it brings a fine reward in times like these. It is our most dependable and least competitive form of load. Maybe that accounts for its lack of development. Domestic lighting, with us, is one of the classes of revenue that has regis-

tered an increase each year, in spite of self-practiced economies on the part of domestic consumers. Why, 10 per cent of all kilowatt-hour sales and 28 per cent of total electric revenue is derived from domestic lighting. In six years, by constant hammering at direct sales, and with cooperating dealers, stimulated by our promotional program, we estimate that 200,000 kitchen lighting units, 30,000 semi-indirect floor and table lamps, 60,000 semi-indirect living, dining and bed room fixtures, have been sold, each increasing existing use from 50 to 200 watts. We estimate that the 300,000 lighting fixtures alone represent approximately $1,000,000 in annual revenue.

Much is said on the subject of lamp sales, especially by dealers who sometimes feel that we have no business selling these staple items. Yet it must be realized that if we do not push even lamp bulbs, the sale of these staples will not go forward as it should. Last year we sold some 366,000 Mazda lamps direct to our consumers, it is true, but we increased the average wattage sold to 59.5 watts from the dealer average of 50 watts. Just one watt increase on the 366,000 lamps sold by our organization in 1932, assuming a two-hour daily usage and applying our average domestic lighting rate of 5 c., would have produced 267,000 additional kilowatt-hours and $13,302 in annual revenue.

In our promotional work on domestic lighting, and in the lamp campaigns we plan to conduct this year and next, we are making special efforts to put this activity on a purely load-building basis. In the first place, we are not interested in small lamps, nor in tinted or colored lamps, and our entire effort will be on lamps of the higher wattages, because after all we are after load, not lamp sales.

Concluding this part of our round table, I sincerely recommend to you that your domestic lighting be given a new consideration. Our own experience has convinced us that energetic efforts in its promotion bring not large but certainly steady and worthwhile results in revenue and in public satisfaction.

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Wiring

Question: Would a plan to modernize wiring—perhaps a Red Seal plan for rewiring old homes—be propitious?

MR. CARROLL: Bottleneck of appliance sales is the wiring in the houses of our customers. Are we sufficiently out of the depression to take advantage of the inevitable rebuilding and remodeling boom which is bound to start just as soon as business picks up? There has been little or no new building during the last two years. Repairs and painting, upkeep of all kinds has been put off, neglected. Just as soon as there is some money loose in the country again, we are going to see a great deal of this deferred maintenance taken up. Will it all go to the painter, the plumber and the interior decorator, or will we be sufficiently on our toes to be right on hand to show that the unseen wiring in the walls must be brought up to 1934 standards, too? Would a Red Seal plan of rewiring do it? We must not be caught napping.

Mr. Holloway: I doubt very much if a plan to modernize wiring at this time would be of great value. Customers are not spending money freely and will not make improvements in wiring circuits unless it is absolutely necessary to improve their lighting conditions. While it is true that an activity carried on now might sell to some extent the idea of better wiring, I am of the opinion that the expense would not justify the actual results and that we would have to duplicate the effort at a later date. I doubt even if a Red Seal plan would accomplish the results desired. Just as soon as people begin to think about improvements in their homes and to make an expenditure of capital on them, then such an activity would be of great benefit. In my opinion, the right time has not yet arrived, but I agree with Mr. Carroll that we must be on the lookout to see that the opportunity for such an activity does not pass.

Mr. Stahl: It does not seem to me, either, that a plan to modernize wiring would be propitious at this time, but with an improvement in economic conditions there will be a scramble to recondition homes and we should be prepared to get our share of this business at that time. It has been estimated that 25 per cent of the families are "huddling;" that is, two or more families are living together. When employment increases there is bound to be a big reconditioning movement, as well as one for new construction.

Mr. Vinet: A modernization-of-wiring campaign is advisable in only one way; that is, very little new building is going up and, unless some rewiring and Red Seal work is installed, the electricians and contractor-dealers will have very little work to do. My feeling that it is inadvisable just now, however, is because our analysis of conditions at present is that people have not yet started to spend very freely and what they are spending is in small units and when a greater degree of optimism does appear, the first money will be spent for exterior necessities, such as clothes, automobiles, house painting and the like. The actual household necessities will be the last in which investment is made.

Mr. Frost: A carefully-organized wiring modernization program could be inaugurated in the near future, in my opinion. As our customers come out from the doldrums in which they find themselves, they are going to be open to suggestions for improvement and betterment of their conditions, particularly of their home conditions. How far this program should be allowed to extend and how soon it should be put into effect is impossible to say at the present time. So far as we are concerned, we have not laid down any definite outline of this type of sales activity, but have it in mind. When the time is ripe we will be ready to spend considerable promotional effort along these lines.

The Red Seal plan, under the restricted operations which characterize every electrical company on the Coast and the restricted operations of the Pacific Coast Electrical Bureau, is doing as well as might be expected. Our industry owes a real debt of gratitude to the Red Seal program. It has been a consistent producer of additional business in good times and bad, and we are definitely committed to any kind of a program which can use the Red Seal plan as its basis of operation.

Mr. Carroll: So far our comments have been very similar and very general. Can you give us some more definite ideas, Mr. Rice, since I know you have made a more intimate study of the problem than most of us?

Mr. Rice: In the first place, the market for rewiring, even in newly-built-up cities, is almost 100 per cent. A large percentage of structures, and particularly those in southern California, were built during boom times and before the Red Seal idea had taken hold to any extent. As a result, the provisions for electric service are extremely inadequate.

A well-organized plan to modernize wiring should produce results. Such a plan would have to be thought out carefully and definitely presented to the public with prices and terms per outlet or per unit. And to get the maximum volume, some type of extended payment plan would be desirable. Such a rewiring plan would carry in its wake a demand for new fixtures, new lighting equipment, new appliances and, in many cases, complete electric installations. With an industry sponsorship, such a plan could be trade-marked with a red seal, green seal, or some other trade name that could be advertised and promoted and that would tie-in with the idea of modernization.

ENGINEERING ROUND TABLE

OUR INDUSTRY has for sale electric service. Unlike other industries, our capital is invested mostly in what is known as "plant." This plant investment demands continuous pay in the form of interest and dividends. Savings in plant, therefore, not only saves original cost, but also the ever-present item of interest. I believe I can state fairly that the engineer has had delegated to him the major responsibility for this plant investment and, therefore, the major responsibility of the industry. This, to me, is the fundamental reason for association work by engineers of the industry.

Imagine for a moment the progress of our industry if its engineers could not exchange ideas and experiences. True, it is not necessary to have an organization to accomplish this exchange; it is, however, the method to obtain the most value at the least cost. Association work enhances the value of advice and consultations rendered managements in legislative matters, as well as assistance to the commercial and accounting groups of our industry.

E. H. COLLINS,
Chairman, Engineering Section,
Northwest Electric Light & Power Assn.

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Plant Modernization

Question: When, if at all, do you consider that investment in plant modernization is justified under the present conditions of excess capacity and reduced income?

IN THE DISCUSSION

*Mr. Blank**	*: Engineer, Power Company A, chairman.*
E. F. Pearson	*: Assistant Chief Engineer, Northwestern Electric Co.*
H. L. Senger	*: Chief Engineer, Idaho Power Co.*
R. C. Powell	*: Mechanical Engineer, Pacific Gas and Electric Co.*
Mr. Doe	*: Chief Engineer, Power Company B.*
An Editor	*: ELECTRICAL WEST.*

CHAIRMAN: To make a fair study of the conditions under which investment in plant modernization can be made, consideration must be given the interests of three parties—the investor, the employee and the consumer. To protect the investor, modernization must be studied very carefully from the standpoint of return, because the rate of fixed charges has increased, thus making a higher percentage savings imperative. This is true particularly of fuel-burning plants, where there has been and will continue to be a rapid development, especially following the return of better business conditions. Long-term investments in such stations do not appear sound.

Mr. Doe: I am impressed with the thought, without being able to prove the fact, that there are more changes pending within the industry as a whole, both in apparatus and methods, at the present time than ever before in its whole history with the exception of the formative period. Such being the case, I believe that modernization should be postponed as long as possible in order to reduce future obsolescence to a minimum.

Mr. Powell: I agree with that. Due to changing economic conditions and probable improvements in the art which are impossible of present evaluation, it is better judgment to defer expenditures until such expenditures can be made to earn and may be more in line with future conditions.

Chairman: On the other hand, the consumer must be protected in his rates and service rendered him, and it may be possible that modernization may improve both despite good physical condition of the plant and general service.

Mr. Senger: A plant that is modern in every respect today may be quite out of date tomorrow. The electrical utility finds a very alert and merciless competitor in the rapid changes of the art, and managements must be keenly alive to the necessity of meeting changes. I believe, however, that plant modernization under existing economic conditions is not justified except in so far as it might be done to forestall the time for new investments in new plant capacity, which can be determined only by very accurate analyses and estimates of costs.

Mr. Powell: It also is necessary to consider that the plant capacity that can be modernized profitably is, for the average utility, but a small proportion of the total and probably is idle at present. Hence any expenditure would increase present costs.

Chairman: That is a good point, particularly considering that, with excess capacity, it would be assumed that fixed charges, such as interest, taxes, insurance, etc., all have increased considerably above those of normal times. However, the investment in existing plants should not be jeopardized by permitting old hazardous equipment to continue in operation; this should be repaired or replaced. Also, the investment should not be lost or water rights forfeited unless it can be proved that the cost of preserving the property is prohibitive or that the capacity never can be used to advantage.

Mr. Pearson: It may be entirely feasible to shut down an existing plant by making additions or betterments to another existing plant and thereby accomplish an overall saving by lowering operating expense to such an extent as to more than offset the increase in fixed charges.

Chairman: That brings up the humanitarian aspect of modernization. In order to protect the welfare of employees, an extensive program of work done toward their elimination from the payroll cannot be justified. However, improvements requiring mostly labor can be made. It might be proposed in connection with much of the system equipment that consideration be given the work that can be done at this time on those portions which later cannot be released from operation. During this time of reduced demand, such work often can be done to an advantage.

Mr. Doe: Considering that the central station business finds itself considerably overbuilt and at the same time faces increasingly active competition, it would seem that it would be most difficult to "sell" investors on plant modernization as long as such a situation exists.

Chairman: Modernization is purely a matter of economics. It is probably most difficult to justify modernization of an all-hydro generating system, as any work which is done may result in increased capacity with no material reduction in operating expense. However, men can be used to do work which requires much labor, such as rewiring switchboards, replacing inaccurate meters, improving safety conditions, lighting or test facilities. In the case of active fuel-burning plants, modernization is justified more readily because improved efficiency will reflect directly in fuel expense. Furthermore, such improvements may involve relatively little capital outlay. The elimination of inefficient pumps may be feasible; boiler setting may be improved; embrittlement

*In all cases where names are omitted, the contributor has asked to remain anonymous. However, each comment included in this and succeeding discussions is a verbatim excerpt from the contribution of an authority known to the editors.

of boilers may be discovered and steps taken to remedy this trouble. If the blading of the machine requires replacement, water rates should be checked to determine if a new design would effect a reduction in fuel expense or give a longer life. Often small changes will reduce the plant losses appreciably. As for inactive fuel-burning stations, probably the best thing which can be done is to keep them in repair for standby operation, as new developments undoubtedly have made these stations already obsolete.

Mr. Pearson: With business conditions on the up-grade, as they now undoubtedly are and will continue to be, the load regained by power companies may have to be taken on at points on the system where capacity is insufficient or where efficiencies are below standard, with the result that plant modernization will be required in order to effect over-all savings.

Chairman: Particularly on systems having a combination of steam and hydro plants is such modernization justified, as increased capacity and reduced losses on the latter will directly reduce fuel expense. Furthermore, investments in the rehabilitation of hydro plants already having a relatively-high efficiency are justified because obsolescence does not affect them at such a high rate as it appears reasonable to suppose in the case of fuel-burning plants. As the hydro plant will be active for a long period of time and as the increased capacity often can be obtained for a low cost, this capacity will become extremely valuable later when the normal rate of growth returns.

Mr. Senger: A large immediate field of activity also lies in the thoughtful overhauling of distribution systems. Distribution engineering has not shown the same degree of progress that is evident in generating station and high voltage transmission engineering. Careful analysis of distribution facilities usually will disclose the immediate benefits to be derived from improved load allocation, reduced service interruptions and better voltage regulation. The reduction in transmission losses incident to such work further aids in deferring the breaking of new ground in plant investment.

Chairman: In this connection, the improved operation of lines can be obtained by reducing tower-footing resistance and other such modernization features. The lines should be checked for unsatisfactory conditions, such as vibration, and corrective measures applied.

Mr. Senger: Prudent investment also can be made in the use of joint poles with communication companies. Experimental installations have proved that joint construction with voltages considerably in excess of 5,000 volts is entirely successful.

Chairman: Mr. Editor, will you kindly sum up the important points of this discussion?

Editor: From the foregoing comments, I would say that plant modernization, while desirable and necessary in some instances, hardly seems justified under current economic conditions because of the investment aspect. Capital outlay is not prudent because of reduced income and the difficulty of inducing investors to provide such funds. Modernization seems to be considered only in the light of current savings, with the future benefits doubtful because of rapid advancement of the art, tending toward rapid obsolescence. Modernization, where justified, must show appreciable immediate benefits and often is used to spread work among the employees.

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Maintenance

Question: Do current economic conditions require engineers to distinguish between essential maintenance and adequate maintenance? Have you found it possible to correlate reduced personnel and budgets into adequate maintenance programs?

IN THE DISCUSSION

M. T. Crawford	*: General Superintendent, Puget Sound Power & Light Co., chairman.*
L. J. Moore	*: Executive Engineer, San Joaquin Light & Power Corp.*
W. S. Hill	*: General Superintendent, Grays Harbor Railway & Light Co.*
E. H. Collins	*: Engineer, The Washington Water Power Co.*
Mr. Doe	*: Electrical Engineer, Power Company C.*
Mr. Roe	*: Operation Engineer, Power Company D.*
An Editor	*: ELECTRICAL WEST.*

MR. CRAWFORD: Economic conditions which utility companies are facing at present make it imperative that cash resources be conserved in order that all absolutely necessary obligations be met without impoverishment or jeopardizing the credit position. This makes it incumbent upon engineers to scrutinize maintenance expenditures carefully. Essential maintenance, which is that which is absolutely requisite to safe operation and service, is the irreducible minimum. If essential maintenance is not done, the system will deteriorate and no economy will be effected.

Mr. Doe: It is somewhat axiomatic that economy should not be had at the expense of deferred maintenance, but there are certain phases of the maintenance problem that can be studied at this time to an advantage. For example, the overhauling of equipment in many instances is carried on according to a fixed schedule which will be found to be one in which the periods between overhauling of the equipment are assigned arbitrarily, without regard to the actual duty to which the equipment is subjected. There may be an opportunity to decrease maintenance expense in some cases, since a study of the duty on the piece of apparatus often will permit lengthening the period without jeopardizing the value of safety and operating conditions of the apparatus.

Mr. Moore: My thought is that no maintenance should be postponed if such procedure would create a hazard either to service or to life and property.

Mr. Collins: The ingenuity of engineering training and experience is imperative in these times to distinguish between essential and adequate maintenance. Over a period of years there occur spasmodic tests of apparatus and structures. This experience is valuable in deciding necessary maintenance. The engineer not only has the training to evaluate these facts, but also the knowledge to substitute for or eliminate the particular apparatus for the time being.

Mr. Crawford: Adequate maintenance is that which is fully satisfactory and will keep the system in excellent operating condition. This involves an additional increment of work and expense which, under ordinary conditions, would be fully justified. A fine degree of judgment must be used to distinguish between the two standards of maintenance and effect economy without injury to the system or service.

Mr. Roe: If "adequate maintenance" is meant to apply to long-time maintenance, then we have found it necessary to limit our expenditures in this direction to cover a shorter term of years.

Mr. Collins: The human element also enters this discussion. The operator is inclined to be conservative. With apparatus or structures showing evidence of failure or questionable operation, he is wont to spend money for super-added insurance against failure. On the other hand, the engineer can figure closer to the limit. He is in a better position to evaluate the possibility of failures, the probable number of failures and their effect upon the standard of operation and value of property under current economic conditions.

Mr. Crawford: We must distinguish between that which is desirable and that which is absolutely necessary. We may have an old unit which it would be desirable to replace with a unit of modern design on account of greater reliability and convenience. If, however, the old unit can be repaired at a moderate immediate expense, and then will give essential service, it may be good business to take some chance on its reliability, put up with some inconvenience and lack of modern appearance, and in

this way defer replacement. Deferred replacements may be good business when deferred maintenance is not.

Mr. Moore: We should not spend money for appearance in times like these. With conditions as now exist, with electric revenues in all classes of business showing decreases, it becomes necessary to scrutinize seriously all maintenance costs. It is necessary to confine maintenance to essentials only.

Mr. Roe: No attempt at all has been made to reduce essential maintenance, because a step in that direction would be questionable, and we feel that we cannot afford to lower perceptibly the standard of quality and continuity of service which has been established. We have found no difficulty in carrying out our maintenance budgets because of our past and present attitude toward the meaning of adequate maintenance.

Mr. Hill: We have been more fortunate in securing adequate maintenance in the power plant than on the distribution system. With reference to power plant, we have been able to secure adequate maintenance in most instances with reduced personnel and budgets. This is due mainly to our ability to secure hogged fuel in preference to oil fuel. Maintenance under these operating conditions is a great deal less; wages and material cost also are lower. This question of lower wages and lower costs of material has been a matter of great assistance in securing adequate maintenance under these trying economic conditions.

Mr. Moore: The San Joaquin Light and Power Corp. has adopted revised policies of maintenance which may be of interest. They were not entirely the result of the present economic conditions; nevertheless, they are in keeping with the spirit of the times. The inspection of distribution transformers as a major activity has been discontinued. There is a routine inspection carried on, however, by service crews and line crews in the course of their usual work. That is to say, crews are instructed to inspect all transformer banks to which new connections are being made, or on which work is being done. Also line crews, which finish a construction job early in the afternoon, for example, are expected to inspect two or three banks of transformers in the neighborhood before they return to the shop. Along with the inspections, of course, go the addition of necessary, oil, cleaning of bushings and such maintenance work as is required. By means of this system, a considerable number of transformers are inspected each year and, of course, the proper record is made so that later on, if it seems desirable to make a general inspection, the records will indicate those transformers which have been gone over recently and which may be eliminated from the general inspection. Under the present system it is the practice, to some extent, to concentrate inspections in territories where there seems to be the greatest need for transformer inspection and maintenance.

Mr. Doe: Distribution and transmission lines undoubtedly should be maintained in a safe operating condition, but this is no reason for replacing or stubbing poles that have a few years of useful life in their present location and with their present loading. The recommendation for pole replacements resulting from inspection depends so much upon the judgment of the individual making the inspection that careful consideration of the problem, in many instances, will justify a check of both the actual condition of the pole and of the loading as well.

Mr. Hill: We were very fortunate in having practically entirely rebuilt our distribution system since 1926. For a number of years we have had a very rigid annual inspection of our distribution facilities, which has paid large dividends in good reliable service, but under present economic conditions it has been necessary to take care of only essential maintenance, and our 100 per cent service has suffered somewhat. For several years we did not have a primary wire down anywhere on our system, in spite of the fact that we are only 12 miles from the ocean and 65- to 70-mile gales in the winter are quite common. This past winter we have cleared some trouble, which, after investigation, we are sure would not have occurred under our former system of adequate inspection.

Mr. Crawford: The reduced budgets can be made to go as far as possible by scanning available stocks of materials and equipment carefully and adapting them to the needs, even though they are not exactly what is desired. It may pay to make more thorough inspections with the object of anticipating failures and avoiding emergency overtime repairs. An adequate insulator-testing program, followed by replacement under economical working conditions, may be a means of reducing expense by avoiding expensive emergency replacements of insulators which fail and interrupt service. The same principles apply to other units of equipment.

Mr. Moore: On our system, the records of routine meter tests have been studied continuously and the improved accuracy of meters has indicated to us that routine tests are not required as frequently as during the period immediately subsequent to the World War. As a result, the period of tests on single-phase meters, covering domestic lighting and domestic cooking and heating, has been extended from time to time until at present we are operating on a five-year test schedule. Meters of the classes enumerated comprise the larger percentage of the meters on the system, and such a schedule, of course, reduces materially the cost of meter testing, and has made it possible to operate the department with a smaller number of men than would have been the case under the test schedules in effect five to ten years ago.

Mr. Doe: Savings also have been effected on some systems by the setting up of new relay test schedules which allow a reduction in the personnel and traveling expense of the test crew. Certain overhaul tests on the less-important relays are made less frequently. The more important relays, the operation of which affects a considerable portion of the system, are tested just as frequently as ever, but it has been found that less-frequent tests can be made on many of the less-important relays without causing service to consumers to suffer.

Editor: Has it been possible to correlate maintenance of this type with reduced budgets and personnel?

Mr. Crawford: With the reduced personnel which has resulted from a lack of construction work, it sometimes has been a problem to muster enough men to take care of adequate maintenance and handle emergency repair work during extensive cases of trouble. Essential maintenance, however, can be taken care of, and for emergency trouble the regular forces can be augmented by listing and organizing for emergency call the other employees not normally engaged in maintenance, but whose experience fits them for certain useful work during trouble. Such an organization is suggested in my article in the January, 1933, issue of ELECTRICAL WEST.

Mr. Collins: The "cut and try" method has been necessary to correlate reduced personnel and budgets into maintenance programs. Our first problem was to evaluate essential maintenance. Our next problem was to keep our valuation of essential maintenace in step with the customers' requirements for service and their ability to pay for such service. This, of course, was measured to a large extent by the budget available after paying expenses, and then by balancing dividends against a maintenance of property that would not lead to future difficulties. In general, it was found that cuts in maintenance were too conservative. Consumers were more tolerant of interruptions. Due to decreased consumption, facilities, even though poorly maintained, were more adequate than was estimated. Maintenance, therefore, has been reduced progressively, and it appears that there is still room for further curtailment. Engineering personnel has been cut too much. This, however, seemed necessary to locate essential work which immediately showed up in a lack of a third of a man here and a quarter of a man in some other work. This made it possible to take back such men as were made up of the quarters and thirds that were lacking. It is believed that if less drastic cuts had been made in personnel, more rapid cuts could have been made in maintenance. The net result would have been more dividends.

Chairman: Mr. Editor, will you briefly sum up these remarks as a conclusion to this meeting?

Editor: Clearly, the consensus of opinion seems to be that it is necessary to distinguish between essential and adequate maintenance. The problem appears to be that of correlating minimum budgets with a maintenance pro-

gram that will provide satisfactory service without impairing the value of the property. This has been done by eliminating or spreading routine inspection and overhauling, and by deferring replacement if repairs will produce reasonably satisfactory service. The value of the engineer in determining just what essential maintenance is and in protecting the consumer and investor has been emphasized. This discussion has been convincing proof that properties are not being allowed to depreciate, although the demand for economy has forced careful scrutiny of all maintenance expenditures.

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Network Distribution

Question: Does the radial or primary network distribution offer the most economical distribution system for present load densities and for providing for ordinary growth? Are Western cities economical units for combinations of the two systems?

IN THE DISCUSSION

S. J. Lisberger : *Division Chief, Electric Distribution and Steam Engineering, Pacific Gas and Electric Co.*

P. P. Ashworth : *Distribution Engineer, Utah Power & Light Co.*

A. W. Copley : *Engineering Manager, Westinghouse Electric & Manufacturing Co., San Francisco.*

R. Rader : *Engineer, Puget Sound Power & Light Co.,*

W. C. Smith : *Engineer, General Electric Co., San Francisco.*

R. G. Boyles : *Superintendent of Distribution, Southern California Edison Co., Ltd.*

P. B. Garrett : *Engineering Supervisor, Westinghouse Electric & Manufacturing Co., San Francisco.*

E. R. Northmore : *Superintendent of Electrical Distribution, Los Angeles Gas and Electric Corp.*

MR. LISBERGER: After three years of careful study of this subject with reference to our own system, I do not think that the question can be answered generally, since each system's characteristics have a decided bearing on the economical and physical solution to the problem. Probably the answer is best approached by endeavoring to answer the following questions, assuming, of course, that there are no extensive network systems installed already in the territory under consideration:

1. Is the present radial system delivering a high grade of service, i.e., are there sufficient interruptions to service to warrant any improvement?
2. What will be the load growth in the next five or seven years? Will the territory tend to change in character, will the load shift to other sections, are there any projected civic improvements or changes that will tend to develop new districts and reduce the load on existing areas?
3. Having answered these questions, if any change in system is contemplated, what will it cost and what will a continuation of the present system or modification thereof cost?

Answering these questions involves most careful study to work out the estimated load growths, capital costs, the question of write-offs on the existing system made necessary by any change, and to give careful study to the carrying charges on new capital added. The last is most important, as any major change means that, when a new system is installed, it is most probable that it will be some time before the load builds up to a point to make full utilization of the new facilities installed.

Studies of our system show that in the territory where a secondary network might be installed: (1) the quality of service given from the radial system is of a high order and, from the standpoint of improvement in service, no capital expenditures are warranted; (2) the question of the growth of load is one that is most difficult to answer at this time. It might appear that for a number of years the density of load in this section may not materially increase, since there are many indications that there are sufficient buildings, offices and similar spaces available for some little time to come, and with the completion of the Bay bridge project there may be some shift in the load so, (3) under these conditions, any extensive change in system is not warranted, particularly as the first step in the network is quite expensive because sufficient facilities must be installed in the beginning and a definite plan must be followed else the system will not be properly coordinated when the second step of the installation is made.

Unless the territory under consideration is growing at a rapid rate, the increment of load that must be taken on each year is comparatively small. For example, in a given territory the annual load increment in a year may not be over 1,500 kw. If this rate is maintained for four years, the total growth will be of the order of 6,000 kw. Actual studies show that it is difficult to make the first installation of the network for anything less than 6,000 kw.; thus, if a change in system is made, the first cost of the network system is quite high in order to take on a load growth of 1,500 kva., and the capital charges that must be carried until the load builds up to the capacity of the system installed likewise will have to be carried for a number of years. Our studies show that with the conditions existing on our system, we can meet this load growth at a much lower capital and carrying charge by making certain modifications to our existing system, continuing in the main the radial idea, but supplementing the number of feed points and making use of the existing facilities to their fullest capacity.

Our experience shows that it is most difficult to determine load growths. By following the plan mentioned, we can meet ordinary load growths at much lower costs and maintain the high quality of service that is now being given; if, within a few years, conditions should change, our plans are so laid out that we can go to a network system for the entire territory or, in those cases where the load justifies, can install spot networks that will relieve the radial system of heavy loads that it might be difficult to handle with the existing facilities installed.

W. C. Smith: Some two years ago there was introduced into the distribution picture the factory-assembled primary network unit, with its automatic load ratio control, metal-clad switchgear, and complete transformation, relay and metering equipment.

In the short period which has intervened, and in the face of extremely adverse economic conditions, careful analytical studies by many utilities and actual operating experience in the field by several have demonstrated conclusively that the primary network system offers to the art of distribution a new method of attack which often will prove to be the most economical for the particular conditions involved.

To be sure, it is not to be considered the one and only panacea for all medium-voltage distribution system layouts. Rather, it is to be looked upon as a system which, if all factors are recognized, will in many cases show the minimum carrying charges over a period of years.

Comparing the conventional radial system with the primary network system, the former may show up favorably where one is considering a large block of existing load, or where a substantial load is building up very rapidly. On the contrary, in a district where the load is lighter, and growing slowly, the primary network system is put into a very favorable position, due to its comparatively small carrying charges.

At the same time, the primary network will reduce substantially the losses, provide better regulation and better continuity of service.

Mr. Rader: Detailed studies show that each system, and combinations of the two, have fields of usefulness. Sparsely-settled districts can be served most enonomically by the radial system; high-density areas can be networked economically. A few years ago it was considered uneconomical to install networks for load densities of less than 5,000 kva. per sq. mi. Now consideration is given to overhead networks with less than half this figure. The trend is toward networking cities and

planning extensions of the system into adjacent suburban areas. Locations of substations are planned in advance, spaced far apart at first, with additional stations going in between when load requirements warrant. Initial substations are developed with transformer units as small as 200 kw. with automatic reclosing, pole-type oil switches, or possibly reclosing fuses. Later, these probably will be replaced with standard network units. Large and expensive, full-automatic substations no longer are considered necessary for the economic application of the network principle.

Mr. Ashworth: Without being able to support the statement by a concrete case or set of figures, it is my opinion that, initially, the radial system is always the more economical type, but as loads increase and greater refinement of service is warranted, the primary network may be justified. It would appear for maximum over-all economy that the system development should be from the radial to the network system, the latter being adopted progressively as load and service conditions in certain areas warrant. There always will be fringe areas which will continue to be served by radial feeders.

Mr. Boyles: A study was made of a high-grade residential community having a population of approximately 18,000. This study showed that this territory, comprising an area of 1½ sq. mi., could be provided with a 4-kv. network system at a slight saving over the usual radial system. Studies of load and growth showed that this area will reach approximate saturation in the year 1937 and that the load will have reached a maximum peak of 5,300 kva. that year. These figures are merely cited to give an idea of the magnitude of the power demand at this locality. On the basis of 6,000 kva. installed capacity, comparative costs figures were prepared, covering the installation of a typical semi-residential area substation complete with four regulated circuit positions for radial distribution, as compared to the installation of a 4-kv. network system of equivalent capacity with all units placed underground, complete with automatic line-sectionalizing and automatic tap-changing under load features. This study showed that the 4-kv. network system could be installed at a saving of approximately 1 per cent. On this basis it would appear that no great economy can be realized with the first cost of the 4-kv. network system, but it is reasonable to assume that the maintenance cost on network units, installed underground, will be less than the cost of maintaining land, buildings and equipment at a substation. In addition, the network system will possess distinct advantages over the radial system from the standpoint of improved service, greater flexibility, lower losses and better regulation. An outstanding advantage of the network system is that it will eliminate the necessity for a number of feeder circuits on pole lines in a territory where space is extremely limited even at present.

Mr. Northmore: We have not made any detail studies on the application of the primary network system to a particular area, and without having made such a detail study my remarks must be only of a general nature.

The reduction in the rate of growth changes the problem of primary distribution. With only small increments of new territory being added, the use of the network with its smaller capacity placed in proximity to the new load appears to offer many advantages.

Thus, it will be possible to supply at least four distinct areas of different circumstances and conditions from one set of high-voltage distribution feeders. Where conditions are right, advantage could be taken of the economy of one transformation by simple high-voltage radial distribution. When this cannot be done, the intermediate voltage can be used, employing either small radial substations or a primary network system. It always will be possible to have overhead secondary networks where maximum continuity is desirable or where high load densities occur in limited areas.

Mr. Copley: During the last two years Westinghouse engineers have made extensive economic studies comparing various types of distribution systems which might be used in serving light and medium load density areas where open-wire overhead secondaries usually are employed.

In general, the primary network has been found to be cheaper than the other systems at the lighter load densities. In two cases, at the heavier densities considered, the overhead secondary network was the cheaper system. In a majority of the other cases studied, the shape of the cost curves are such as to indicate that the latter probably will prove to be the cheaper system at some density above those considered. It is interesting to note that, in general, the two network systems showed up very much more favorably than did the radial systems with which they were compared. Because of the ability to build and extend these systems in small increments, thus allowing the system capacity to be kept close to the system load, and the ability to locate the transformer units near the loads they normally serve, it is probable that the economic advantage to be gained by using one of the network systems will be even greater than that indicated from the studies, where a uniform load growing uniformly has been assumed. This flexibility largely eliminates the necessity for predicting the location and magnitudes of future loads, thus avoiding long-range distribution planning, which at best is based on scientific guesses.

In the load-growth studies, each of the systems was applied to a uniform load in a 16-sq.mi. area growing at a yearly rate of 10 per cent from 8,000 kva. to 85,600 kva.; that is, from 500 kva. per sq.mi. to 5,350 kva. per sq.mi. Each system was carefully laid out to serve the entire load area and was expanded as required to keep the system capacity sufficiently in excess of the growing load. The total system investment within the load area to the customer's services then was evaluated for each step. Curves showing system investment per kva. of system peak load for the various load densities were plotted from these data. To these curves were added approximate capitalized losses taken from static load studies. This sum of system investment plus capitalized losses per kva. was plotted against load density in the form of smooth curves in order to facilitate comparison between curves. A comparison of these load-growth curves with curves obtained from static load studies showed that erroneous conclusions as to the relative costs of the various systems would be arrived at from static load studies, because the additional investment required to take care of load growth varies considerably with the type of system.

The cost of changing over from an existing distribution system to a network system naturally could not be included in these general analyses. Each case is an individual problem, and the cost of changeover must be estimated and weighed against the advantages to be expected from the change over a period of years.

In general, the primary network appears to lend itself more readily to changeover, since in many cases a large part of the existing circuits and equipment can be used. Changeover to an overhead secondary network system probably will involve a more extensive change in an existing system, in most cases, if advantage is to be taken of the elimination of the intermediate-voltage transformation. However, the saving resulting from the use of this type of system at the higher densities often will justify the expense of changeover, especially if the change is made gradually by starting a few spot networks or small distributed networks in the heavier-density locations and then extending the areas networked as the load grows. Also, when the times comes that the distribution system must be put underground, the overhead secondary network can be changed readily to an underground network with probably a minimum of expense.

One very promising application for overhead secondary network equipment is in spot networks, since for loads up to about 300 kva. it is possible to render duplicate service with a spot network at considerably less cost than with an automatic primary changeover scheme.

Mr. Garrett: The discussions indicate that this question is of paramount importance: Will the types of distribution systems now in general use satisfactorily meet the demands of the future from the standpoint both of cost and service requirements? With an ever-increasing use of new appliances, a high degree of reliability and refinement of service will be primary factors in future engineering considerations for dis-

tributing electrical energy. The consensus of opinion seems to be that these problems will be solved more readily by a network system than by the radial type.

There undoubtedly are a number of Western cities with areas of the densities considered in our studies, and where, because of certain load conditions, the expense of changing to a network system cannot be justified. However, the merits of the network types of distribution are such that both the overhead secondary and primary network systems should be studied seriously and carefully by all power companies for supplying service in their overhead distribution areas.

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New Sequence Metering

Question: Do conditions on your system warrant adopting the new meter sequence? Are you applying it to old meter installations? To new installations? What type of installation has been found to be most satisfactory to your requirements? Why?

IN THE DISCUSSION

W. R. Frampton	*: Manager of Shop and Test Dept., Southern California Edison Co. Ltd.*
J. P. Surratt	*: Salt River Valley Water Users Assn.*
E. C. Goodale	*: Tacoma, Wash.*
Walter Brenton	*: Supt. Electric Meter Dept., San Diego Consolidated Gas and Electric Co.*
W. H. Talbott	*: Chief Engineer, Portland General Electric Co.*
Roy E. Wenk	*: Everett, Wash.*
An Editor	*: Electrical West.*

MR. FRAMPTON: For some years past our company has been pioneering in the field of outdoor metering. The advantages, such as ease of reading, accessibility for testing, initial cost and the resultant improvement in public relations, are not a theory but a fact. With the approval of the new meter sequence by the National Electric Code, it now is possible to reduce installation costs to a minimum to both utility and consumer.

Mr. Talbott: I am of the opinion that this sequence-type meter will be adopted universally in the future. There are certain conditions which come up quite frequently where the new sequence meter is greatly desired. I have in mind the theft of current.

Mr. Wenk: In some communities where a careful check has been made, about 7 per cent of the residential and small power consumers have been found to have practiced illicit diversion of current. While the national average undoubtedly is below this figure, the most optimistic service men contend that it is at least 5 per cent and the conservative admit that it is greater than 1 per cent. In 1932, the total amount received for this class of electric service was over $1,100,000,000. If the theft of energy amounted to only 2½ per cent, it would mean that approximately $30,000,000 was being diverted from the pockets of the utilities. This is a sizeable sum when one considers that the Wickersham Commission reports that America's annual crime bill is roughly $1,000,000,000, which does not include the theft of current. Of this amount, mail order frauds account for $68,000,000; insured losses due to theft, $47,000,000; forgery, $40,000,000. Compared to the estimated losses due to energy diversion, the spectacular crimes of violence are only petty larceny, the burglary of safes and vaults costing $4,500,000; jewelry thefts, $2,000,000; and bank robberies $1,800,000.

Mr. Frampton: The increase in current theft and tampering with electric meters has become more prevalent in recent years. The new meter sequence will eliminate this practice to a large extent. Where attempts are made by dishonest customers to tamper with outdoor meters, detection will be made easily.

Mr. Surratt: At present we have not adopted the new meter sequence. The advantages are recognized and desired for convenience in mounting and testing, neatness of appearance, protection of the meter, and prevention of diversion of current. Due to the single-phase loads being located in rural districts and the greater portion of prospective customers being served, the meter sequence problem presents a different problem to our utility than generally exists. However, a meter sequence probably will be adopted this year using a base upon which the elements of our present meters can be mounted and also the elements of new meters bought in the future.

Mr. Frampton: The recent improvements in characteristics of meters for outdoor use, plus the features of connecting, disconnecting and testing, have resulted in a material improvement in appearance. Having available for use meters that do not require an external housing has further improved customer relationship. Converting the old meter installation to the new sequence is not always practical and economical except in those cases where irregularities are known to exist. In any installation where there is evidence that tampering has taken place, it is the practice to convert the wiring to the new sequence.

Mr. Brenton: The new meter sequence will be adopted as soon as the necessary changes in the Portland code, which is now under revision, have been made. This will apply to all new installations as well as to old installations where there is a question as to total consumption.

Mr. Talbot: We are applying this type of meter to old installations where theft has been proved and conditions will permit. The only new installations where such meters have been used were those for test and experimental purposes.

Mr. Frampton: One of the big problems facing the utility today is how to make use of the present stock of metering equipment. It is not economical to purchase the modern type of outdoor meter for every installation when other available equipment is in stock which can be used. In cases of this kind, some form of housing must be used which incorporates a safety block with the means for connecting and disconnecting the same as is incorporated in the outdoor meter. Although not as pleasing in appearance, due to its larger size, the outdoor meter cabinet is a necessary substitute. Features of the design have been incorporated in the box which permits it to be used interchangeably in the place of the modern meter. Standardization of this character permits reduced costs to the consumer and the company and the privilege of the company to install either the cabinet or the new sequence meter.

Mr. Goodale: If the box is to fit all needs for both inside and outside installations, it must be thoroughly waterproof, have knockouts on the bottom, back and sides, and a waterproof threaded and plugged fitting for the possible top connection. Its shape should be pleasing to the eye and it should be fitted with links, switches or studs for testing, together with the grounding lug or stud, so that permanent grounding connections could be easily made. Needless to say, the theft-proof sealing feature should be simple but effective.

Mr. Frampton: Special features, such as the solderless connectors on the test block in the cabinet and also on the block in the new sequence meter, reduce costs at the time of installation. The ease of testing when using a safety block also permits an increase in efficiency of this type of work.

The design of an adapter which is a duplicate of the accessories of the new sequence meter permits the majority of the older type meters to be used on the new sequence connection. The application of the adapter is suited particularly to recessed installations where the meter is protected by an enclosure. Installations of this character have all of the advantages of the new sequence meter on outdoor installations.

Editor: From the discussion, I would say that the utilities are convinced of the need for, and practicability of, the new meter sequence. Evidently the meter box and the adapter are becoming prominent methods of adapting older types of meters to the new sequence. Apparently, there will be an increasing use of the new sequence for new installations and a gradual changeover of older installations as conditions warrant such action.

Los Angeles Gas and Electric Corp. Loses Rate Appeal in Supreme Court

AFFIRMING its reputation as liberal rather than conservative, the United States Supreme Court has upheld the lower court and the California Railroad Commission in the appeal of the Los Angeles Gas and Electric Corp. from the 1930 orders of the commission regarding lower gas rates. The decision is far-reaching in its scope, dealing with valuation, percentage of overhead chargeable to construction, depreciation and going concern value. Justice Butler filed a strong dissenting opinion, in which he was joined by Justice Sutherland.

With the downward economic trend, particularly as applied to prices of materials and labor, it is not surprising to find that the decision guardedly gives approval to the principle that the reproduction-cost-new theory of valuation must be flexible. In a lengthy discussion of the entire question of valuation as applied to rate-making, the decision states:

"While cost must be considered, the Court has held that it is not a conclusive or final test. The public have not underwritten the investment. The property on any admissible standard of present value may be worth more or less than it actually cost. The time and circumstances of the outlay, and the effect of altered conditions demand consideration."

This point is given added emphasis by the statement that "the cost of reproducing the property is a relevant fact which should have appropriate consideration."

In ruling that the company had "failed to sustain its attack upon the rate base of $65,500,000," the Court found it "impossible to hold that a return of 7 per cent is so low as to be confiscatory." The company had held that $95,000,000 was a fair value of its gas properties; among the items which had been disallowed from this figure by both the commission and the lower court and in which the Supreme Court concurred were cost of financing, $5,921,470; promoter's cost, $2,500,000; going concern value, $9,228,667; and an unstated sum based upon a higher percentage of overhead chargeable to construction than that figured by the commission.

Although the Court ruled that going concern value was a proper item to be included in the rate base, it held that the historical value of $60,704,000 found by the commission, to which $4,796,000 had been added to determine the final value, had taken into consideration an amount sufficient to cover going-concern value of the property.

The commission's depreciation allowance of $1,072,000, as against that of the company of $2,344,000, was held by the Court to be adequate.

In his dissenting opinion Justice Butler claimed that the "rates should be set aside because arrived at by arbitrary methods condemned by our decisions." He stated:

"In ascertaining the return protected by the Constitution, the commission is required to take into account and make proper allowance for the actual original and the estimated present cost of the property including overheads. It is bound to include a just and reasonable amount to cover going value. The amount omitted in each of these items is large enough to invalidate rates based on the valuation."

He contended that the decree of the lower court should be vacated and the case be remanded for special findings by a master.

Last course open to the company is to seek a rehearing. No announcement has been made as to whether this step will be taken.

In the meantime, refunds to the amount of approximately $3,000,000, which have been impounded in a special fund, must be made to consumers. The rates which the Court upheld mean an annual reduction of about $1,000,000.

Income Rate Cut Seen

As a result of the Supreme Court decision in the Los Angeles Gas and Electric Corp. case, California's Railroad Commission plans to cut immediately the returns of some utilities to 6½ per cent, the president of that body indicated. The reasoning was that, since the Court upheld the legality of a cut to 7 per cent in prosperous 1929 and 1930, a further reduction would be justified in light of present conditions.

Not only a lowering of return, but of rates in California, was presaged by the decision, the commission president declared.

Colorado Commission Will Act

"I see no reason why the decision will not apply to Colorado public utility firms as well as to those in other states," E. E. Wheeler, member of Colorado public utilities commission declared, adding that two investigations into rates are under way now. A survey has been under way for more than a month to determine present replacement costs for utility properties. Some utilities have agreed voluntarily to lower rates in many Colorado cities.

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Washington Moratorium on Irrigation Power Charges

Pending an investigation of rates, E. K. Murray, director of the state department of public works, has declared a moratorium on irrigation power charges, with the immediate objective of relief for farmers facing power cutoff notices because of unpaid bills. Formal complaints have been filed by the department against Puget Sound Power & Light Co., The Washington Water Power Co. and Pacific Power and Light Co., and the utilities ordered to furnish power pending completion of the investigation. The complaints challenge the reasonableness of the irrigation power rates.

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They Maytaged San Francisco

W. L. Hahn, president of Maytag West Coast Co., distributors of Maytag washers, claims that his San Francisco organization is the brightest spot on the coast at the present time—and this is the group he means. Back row, left to right: L. J. O'Malley, divisional manager; Gino Baffa, district manager; Charles Doran; William Saper; J. Perlite; E. Bellani; L. Bosa; C. Zito; A. Ratto. Front row: K. Owens, F. Freitas, R. Strait, Miss Schenone and Miss Maggiora

Begun May 22, a series of hearings are being held in nine Washington cities. "We intend to get action within 30 days," Mr. Murray declared. "Rates should be adjusted to a base which the farmers could meet. The value of service and ability to pay must be determined."

L. R. Sheeley, manager of Pacific Power & Light's Yakima district, denies that his company has shut off any farmer because of existing delinquency in payment of bills, stating that the delayed payments the company now is carrying are seven times what they were 18 months ago.

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Electric Utility Tax Boosted to 9 Per Cent By California Legislators

WORKING feverishly to pass the measure before recessing, both the Assembly and Senate of California approved the Duval bill, raising for two years the tax rate on gas and electric utilities to 9 per cent of gross and on telephone and telegraph companies by ¼ per cent. At the last minute the Senate struck out an amendment that, in event the Riley tax plan to revise state taxation generally failed to pass at the June 27 election, the rates should be boosted to 11 per cent. It was indicated, however, that if the tax plan failed at the election, the increased utility tax rates would be pressed in both houses. The 9 per cent rate will yield an additional $6 millions in revenue in the next biennium.

Increased utility taxes offered a threat to the plan of the Railroad Commission to lower rates. But the Senate adopted the report of the special investigating committee, which recommended that rates be lowered instead of taxes increased; that utility salaries be lowered; questioned the soundness and accuracy of the Railroad Commission's method of determining rate base; suggested tightening up of the depreciation rate allowed utilities.

Also passed was a Senate bill which declares the value of service to the consumer must be taken into consideration in fixing rates. The bill states the Railroad Commission shall not allow maintenance or operation expenditures in excess of those which would be required on a comparable competitive basis, and stipulates that the rate of return allowed "shall not be in excess of the rate of return generally being made at the same time and in the same general part of the state on investments in business undertakings other than public utilities which are attended by corresponding risks and uncertainty." The bill was sponsored by the California Farm Bureau Federation.

Several bills were defeated before adjournment, among them the Robinson-Meeker measure to reduce by 20 per cent the rates of gas and electric utilities (EWEST, May, p. 169); the Jones "Anti-Insull" bill, which would have vested the Railroad Commission with the authority to examine and approve or disapprove contracts between holding and subsidiary companies; and the Powers bill, which would have forced private utilities to pay salaries above a certain figure, donations and similar expenditures out of surplus and not from operating expenses.

When the legislators convene again in July, they will devote their time to consideration of tax matters, their actions to a large extent depending upon the success or failure of the Riley plan at the June election.

Federal Tax In Conference

When the House refused to accept the action of the Senate finance committee in changing the provisions of the 3 per cent Federal tax law, the bill was sent back to conference. The Senate finance committee had lowered to 2 per cent on commercial and domestic consumption, to be paid by the power companies, the 3 per cent levy which the House had passed. The Senate committee also reported a 1 per cent tax on industrial consumers. The taxes expire June 30, 1934, and the Senate would make the law effective Sept. 1 so as to permit any utility which cannot bear the burden to apply to state regulatory bodies for increased rates.

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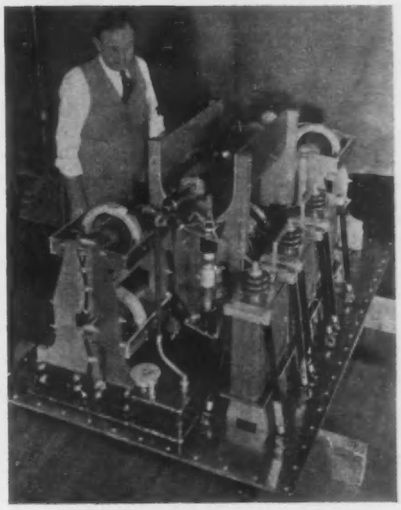
Suspend Oregon Merchandising Order

The recent order of Oregon's public utilities commissioner, attempting to segregate further utility merchandising and other operations (EWEST, May, 1933, p. 168), has been suspended pending further hearing and order. Suspension followed application by utility companies for a reconsideration of the subject; the rehearing is set for June 6.

May Refer Grange Bill July 21

Busy getting signatures on its petition for referendum of Oregon's hydro-electric act (EWEST, May, 1933, p. 168), the Security Owners' Assn. learned from the state Supreme Court that the act in effect regulates taxation and exemption, and that it may be referred to the people at the special election on July 21, instead of waiting until the next general election in 1934. The attorney general previously had declared that the bill carried an emergency clause and consequently was in effect and beyond referendum. The association contends that the law is illegal, inasmuch as it regulates taxation and exemption by delegating power to acquire existing utilities, thus taking the property from the tax rolls of the state.

Inspector X-Ray



Rated at 300,000 volts and 10 milliamperes for continuous operation, capable of producing radiographs of welded steel plate of 4-in. thickness, this industrial x-ray machine, developed by General Electric X-Ray Corp., will inspect every inch of steel welds for 75 miles in penstocks of Boulder Dam. Job calls for minimum of 159,000 separate exposures, involving use of 24,000,000 sq. in. of film. Mounted on special mechanical carriage, it can work inside or outside of penstocks, traveling on a narrow-gage track

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Rocky Mountain District Plans "Electrical Week"

Under the leadership of Rocky Mountain Electrical Assn., all utilities, manufacturers, wholesalers and dealers in Colorado, New Mexico and Wyoming have joined on an ambitious load-building, business-producing program which will climax in an "Electrical Week," tentatively scheduled to begin Oct. 2.

During the summer, a publicity campaign will be waged to stimulate interest in appliances, with newspaper, radio and other advertising media playing a part. Business enterprises and professions not heretofore identified with the electrical industry will be tied in; for instance, oculists will demonstrate eye conservation through the use of proper lamps and illumination; physicians will demonstrate the therapeutic value of health lamps.

Through the Electrical League of Colorado, Denver's program already is under way. During "Electrical Week" the municipal auditorium will house an all-inclusive electrical show, toward which the public will be directed by parades, stunts and advertising. A "Fall Festival of Light" is planned, during which homes, gardens and public parks will be spectacularly lighted.

The "Electrical Week" committee, not including two electrical contractors and representatives of refrigerator, radio and retailers' groups, to be announced later, includes: Fred Norcross, presi-

dent, Rocky Mountain Electrical Assn.; A. L. Jones, General Electric Co., Denver; C. S. Newell, president, Electrical League of Colo.; J. E. Loiseau, G. B. Buck, A. H. Heitzler, E. M. Rowland and F. S. Peterson, Public Service Co. of Colo.; Arthur Prager and H. L. Pinkerton, Albuquerque Gas & Electric Co.; K. W. Kissick, Deming Ice & Electric Co., Deming. N. M.; W. D. Johnston, Mountain States Power Co., Casper, Wyo.; J. J. Withrow, Sheridan County Electric Co., Sheridan, Wyo.; William Trudgian, Westinghouse Electric & Mfg. Co., Denver; A. C. Cornell, Graybar Electric Co., Denver; James L. Adams, Denver Tramway Corp., Denver; E. E. Brazier, General Electric Supply Corp., Denver; John J. Cooper, Electrical League of Colo., Denver; and George E. Lewis, Rocky Mountain Electrical Assn.

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Seattle Gross Revenue Tax Upheld

With Washington's Supreme Court upholding the judgment of a county court, which dismissed the action by Puget Sound Power & Light Co., Pacific Telephone and Telegraph Co. and Seattle Gas Co., the Seattle 3 per cent gross revenue tax on utilities has been approved and goes into effect.

The utilities attacked the validity of the tax on the grounds that the city had no power to levy it, that the state has pre-empted this field of taxation, and that the tax was unreasonable, oppressive and confiscatory because the city was a competitor in the power business.

Justice Blake, who wrote the majority opinion from which one justice dissented, held that the fact that the tax was imposed against the power company as a competitor of the city (City Light), which was exempted, was a "mere incident" since the tax applied to other private utilities. Further, the opinion held, cities and towns are empowered with full authority to impose excise taxes to raise revenue, so long as they do not abuse the privilege or enact measures conflicting with taxes levied by the state. In this case, the state has not entered this tax field at the time the city ordinance was passed.

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Merchandising Code For Rocky Mountain Region

A code of merchandising practices has been entered into by the Mountain States Hardware and Implement Assn., the Colorado Society of Sanitary and Heating Engineers, Rocky Mountain Electrical Assn. and Electrical League of Colorado. Other groups of electric and gas merchandisers are expected to subscribe to the code—a document calculated to smooth out many rough spots in the relationships of dealers and utilities.

The agreement is an outcome of more than two years' efforts to crystallize a code that would eliminate trade practices which have caused dissention, developed price-cutting and other uneconomic conditions.

A high-light of the code discourages "free trials or demonstrations on all appliances which have a reasonable customer-acceptance." Carrying charges are recommended and "installment terms should conform to those required by established and recognized finance companies operating in the Rocky Mountain region." Utilities pledge themselves to refrain from selling appliances or merchandise not directly related to load building.

Important among the recommendations is the one reading: "Where installation costs are borne in whole or in part by a utility in connection with merchandise sales, the same plan should be extended by the utility on similar sales by other retailers, all appliances to be marked 'including installation' or 'plus installation.'"

A basis for cooperation is established by the code declaration: "Appliances sold through any dealer add to the load of the utility, and the latter, therefore, should take the initiative in establishing merchandising plans. Utilities should confer with merchants to eliminate complaints and misunderstandings, and the causes of such." Utilities are urged to eliminate the practice of making sales by calling attention to the convenience of paying merchandise installments with electric light or gas bills; and to advertise in such manner that dealers will benefit throughout the entire territory served by the utility.

Although no definite program to finance established dealers is outlined, such a course is recommended strongly to utilities because "it is to the interest of utilities to secure the maximum number of appliances on their lines" and "they should cooperate in any plan to make available to all dealers adequate financing service for installment sales."

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Skagit Bids Called Twice and Returned Twice

Bids were called on the completion of the Diablo unit of Seattle City Light's Skagit project, to be opened on April 26, and were returned unopened when J. D. Ross requested that they be re-advertised for, to be opened ten days later. But ten days later they were returned unopened, too, also upon the recommendation of Mr. Ross, who is in Washington, D. C., negotiating with R.F.C. for a $1½ millions loan. New bids will be called later.

H. B. Squires Co., Westinghouse Electric & Mfg. Co., Puget Sound Bridge & Dredging Co., Chatham Construction Co. and General Electric Co. submitted bids.

Mr. Ross' action is believed to be prompted by hopes to get an R.F.C. loan on more favorable terms than first indicated. He has requested and plans have been approved by city council committees for a nationally-known engineering firm to make a survey of the Skagit project and other units of the Seattle light and power system. City Light's finances were audited thoroughly by an outside firm recently and Mr. Ross believes the engineering survey should supplement the financial survey, as an aid in getting the loan.

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Arbitrary Rate Cuts Held Illegal

Rates charged by Central Arizona Light and Power Co. for electricity and gas cannot be reduced arbitrarily by the state corporation commission without a valuation of the property and a public hearing, the state attorney general ruled in response to a request from the commission whether an ex parte order reducing the rates could be issued. "The fixing of rates," the opinion read, "requires a valuation of the property of the utility, together with other factors which must be considered, in order to arrive at a reasonable rate which will allow a fair return. . . . Due process of law requires that the utility be given an opportunity to be heard, to the end that its property is not confiscated."

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Bock Is Back . . . Or Is He?

Court procedure will be necessary to establish the status of Otto Bock, Denver attorney, as a member of the Colorado public utilities commission. Mr. Bock, nominated by Gov. E. C. Johnson to succeed Worth Allen, present chairman of the body, was confirmed by the state Senate on May 9, and took the oath of office. Later the same day the Senate reversed itself. Mr. Bock made a demand on Mr. Allen for his seat in the commission, was refused and announced his intention to fight for the office.

Interesting legal points are involved. The Senate did not inform the governor of the vote confirming Mr. Bock's appointment, but officially notified the executive of its second (unfavorable) ballot. Since the reconsideration vote was cast after the Senate clock had been stopped, to permit additional legislation during regular session, Mr. Bock contends it is illegal.

Mr. Bock had been a member of the state public utilities commission for eight years when he retired, as chairman, in 1931. Very aggressive during his former incumbency, he would be a factor in the investigation of utility rates which has been launched by the commission.

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Pacific Coast Bureau Expands Activities

Provision for expansion and diversification of the activities of the Pacific Coast Electrical Bureau along broad lines which will permit adapting statewide programs better to meet local conditions, have been adopted by the Bureau directors. Included in the new plan is the enlargement of the directorate, an increase of the responsibilities of the

local committees in the southern, central and northern regions of California, and a realignment of committee personnel.

Original organization plans of the Bureau have been supplemented by the following steps:

1. Regional operation of the bureau is transferred from the directorate to the three regional chairmen and their executive committees. In this manner, strength will be added to local cooperative activities through enlisting the active affiliation of contractor-dealers and local appliance retailing groups.

2. The regional groups will promote, in keeping with the conditions in each region, programs and activities such as Electric Cookery Councils and Refrigeration Bureaus, development of Red Seal using the statewide specifications, industry coordination, adoption of the standard electrical ordinance, and any other cooperative business-building or load-developing activity which specifically may fit that particular region.

3. The directorate and the chairmen of the statewide committees, together with the Bureau staff, will continue to function in planning and coordinating such statewide activities as the lighting educational work being carried on by Clark Baker, the preparation and promotion of Red Seal standards and specifications, promotion of the standard electrical code and other ordinance activities requiring statewide coordination, and the cooperative advertising program.

The board of directors will be enlarged to include representatives of the San Diego Consolidated Gas & Electric Co., Southern Sierras Power Co., Coast Counties Gas & Electric Co., and Vallejo Electric Light & Power Co. In addition, three more electrical contractors, two manufacturers and two wholesalers will be added.

The realignment of regional committee personnel makes H. M. Crawford, general sales manager, Pacific Gas and Electric Co., chairman of the Northern Region, with C. L. Chamblin vice-chairman; E. G. Stahl, sales manager, San Joaquin Light & Power Corp., chairman and H. H. Courtright, president, Valley Electric Supply Co., vice-chairman in the Central Region; and R. C. McFadden, manager of Power Sales, Southern California Edison Co. Ltd., chairman; and G. E. Arbogast, Newbery Electric Co., vice-chairman in the Southern Region.

Outstanding progress is reported for many of the Bureau activities. Clark Baker, lighting specialist on the staff, in fourteen weeks spoke on good lighting before 104 audiences totaling 15,230 persons. The standard electrical ordinance has been adopted in six California cities and is being considered for adoption in 25 more. The sub-standard appliance ordinance similar to the one now in effect in San Francisco and Portland, Ore., is being actively considered in several communities and perhaps will be passed in Los Angeles early in June. A program for promoting attic ventilation with direct-mail material now is underway. Considerable progress is being made in rural electrification with both the farm-type refrigerator and with soil heating.

R. E. Fisher Presented With Gift

Feature of the last meeting of the board of directors of the Pacific Coast Electrical Bureau was the presentation to R. E. Fisher, vice-chairman of the board, of a portable card table by directors. Each one of the demountable legs of the table was presented to Mr. Fisher by a member of the board representing one branch of the industry. It was demonstrated that no leg could stand alone, but when W. L. Frost, Bureau chairman, attached them to the top, a strong, coordinated and useful article was developed. The presentation was arranged by H. L. Harper, Pacific Coast manager of Graybar Electric Co., Inc.

News Shorts

¶ California State Grange has filed application with Railroad Commission asking that power rates for agricultural users charged by Pacific Gas and Electric Co., San Joaquin Light & Power Corp. and Southern California Edison Co. be revised completely, demand charges eliminated and new rates based upon 5½ per cent net return.

¶ Hearings on application of Gas Fuel Service Co. to serve San Joaquin Valley with gas (EWEST, April, p. 138), outgrowth of farmer boycott on electric power, have been concluded and are being studied by Railroad Commission for final decision.

¶ Fresno, Calif., has formally petitioned the Railroad Commission to evaluate San Joaquin Light & Power Corp. distribution system in the city for condemnation purposes (EWEST, April, p. 138).

¶ George Zelhart, electric heating specialist for San Joaquin Light & Power Corp., and Oliver Hatchery, near Fresno, Calif., have developed new type of brooder consisting of slab of concrete in which are resistance wires, over which is a short-legged table with heavy side curtains. Some 2,000 chicks have been brooded at a cost two-thirds less than with conventional overhead type.

¶ Northwestern Electric Co. sought authority to issue $148,100 in gold bonds to meet interest payments due on bonds in its sinking fund, was denied authority by Washington department of public works on ground that transaction would be antagonistic to interest of bondholders.

¶ Pacific Power & Light Co. will rehabilitate Yakima, Wash., street lighting system, effecting net annual saving of $2,048, if Yakima will renew utility franchise for 25 years. Yakima wants 3.5 per cent gross as franchise fee; company offered 1 per cent for first 10 years, 2 per cent thereafter.

¶ Unless Pacific Gas and Electric Co. agrees to a $250,000 or $300,000 cut in present $780,000 annual street lighting bill, San Francisco's public utilities commission announced it would appeal to the state Railroad Commission. City claims it already has paid for lighting standards, cost of which is amortized in rates.

¶ Hearing into rates, charges and service of Northwestern Electric Co. will be resumed on June 19 by Oregon Commissioner Thomas.

¶ Los Angeles County supervisors renewed for 50 years a franchise with Southern California Edison Co. Ltd., covering all public utility facilities of the company in unincorporated county territory. Company pays 2 per cent of gross for use of roads and streets.

¶ Portland General Electric Co. and Portland Traction Co., subsidiaries of Pepco, reduced salaries from 5 to 17½ per cent and 5 to 20 per cent, respectively. Average: 13½ per cent. This is first reduction for electrical workers since April, 1931, and men accepted cut without arbitration, agreed to work short week to keep more men on payrolls.

¶ Overruling Pacific Gas and Electric Co. objections, California Railroad Commission prepared for immediate valuation of company's distribution system within boundaries of Modesto Irrigation District. District plans to combine private system with its own by negotiation or condemnation.

¶ R.F.C. has agreed to loan Los Angeles Department of Water and Power $22,800,000 for construction of the 271-mile transmission line to Hoover Dam (now officially changed by Secretary Ickes to Boulder Dam). Contract was submitted to state Supreme Court and approved. Of this sum, $20 millions will be spent for machinery, equipment and materials.

Market Review

California and Intermountain—

THE electrical business in this territory definitely is better, according to reports received on business during May. In contrast to the remainder of the country, expenditures for public works still make up an appreciable volume of new construction, although plans announced by the brewing industry indicate that all the revenue from beer will not find its way into the national treasury, but some spread throughout industry in new construction.

Buying for Hoover Dam and the Metropolitan Water District's Aqueduct is the bright spot in southern California. Los Angeles Department of Water and Power placed large cable, wire and transformer orders during the month, and is receiving bids on some 50 large oil circuit breakers in the near future. It has announced an $8,000,000 project

in the Mono Basin, developing some 20 miles of 33-kv. line. Work is progressing on both bridges across San Francisco Bay, although electrical purchases for these projects are as yet confined to small construction items.

Breweries are proposed in great numbers. In San Francisco a $1,250,000 brewery is reported to be under way, another estimated at $200,000 is planned for San Bernardino, another for Anaheim, and still another for Los Angeles. In addition, the Schmidt Brewing Co. announces plans to construct three breweries in Los Angeles, Olympia, Wash., and Salem, Ore. Other projects include a $100,000 milk products plant at Stockton, a beet sugar plant for Hamilton City, Calif., and a new government hospital for San Francisco. One of the largest jobs of the month was awarded the Alta Electric Co., San Francisco, low bidder on the electrical installation for the San Francisco County jail, amounting to approximately $58,000.

Jobbers and manufacturers report that business is perceptionally better, with the additional pleasure that orders have a tendency to pile up. For the first time in several years, current business compares favorably with that of the previous year. Prices on practically all lines have increased. Lead-covered cable is up 10 per cent, rubber-covered up 15 per cent; steel lines such as boxes, etc., have gone up, and schedule material has had several advances during the past two months. In regard to the latter, stable items are moving well and there is a tendency toward larger orders instead of the hand-to-mouth buying that has characterized previous months' business. Appliance lines still are characterized as only fair. Jobbers and dealers feel that this is due to a lack of ready money on the part of purchasers and a tendency toward stiffer credit terms in some lines.

Pacific Northwest—

As usual, business closely watches the lumber industry, the background of business in the Northwest, as its barometer for conditions in this territory. More mills continually are opened up and logging operations started in a few instances. This increased demand is attributed to increased construction and the desire for dealers to stock up while low prices prevail. No new electrical business is in sight in this industry, however, because most plants are improving their present equipment and purchases of additional machinery have so far been confined to second-hand equipment. Pulp and paper mills are continually forging ahead, practically all mills being in operation and running full time.

In an effort to furnish employment, public works are being considered and some municipalities are negotiating for street lighting installations. The marine business is slacking off. However, increased tonnage is being placed in service and eventually will lead to better business from this source. Modernizing elevators and building lighting have helped tide the electrical industry over the rough spots of the depression, but this activity has been confined to the revamping of old buildings, new building still being at a very low ebb.

In the Coeur d'Alene district, lead, zinc and silver mines have enjoyed substantial increases in orders. Although there is no assurance of permanency, it is known that the product on the market is fairly well depleted.

As expected, spring brought considerable advance in the sale of refrigerators and electric ranges. Repossessed apartment houses, which must be modernized before they can be productive, are still the highlights in the merchandising field. Small appliance sales have been steady during the month, but have shown no appreciable increases.

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Barometer

FOR the first time in several years, the all-industry index for April exceeds that of the corresponding month in the previous year, the April, 1933, index going 6 per cent higher than April, 1932. Although the figures for the country as a whole broke through those of a year ago, the excess was much smaller than in the West.

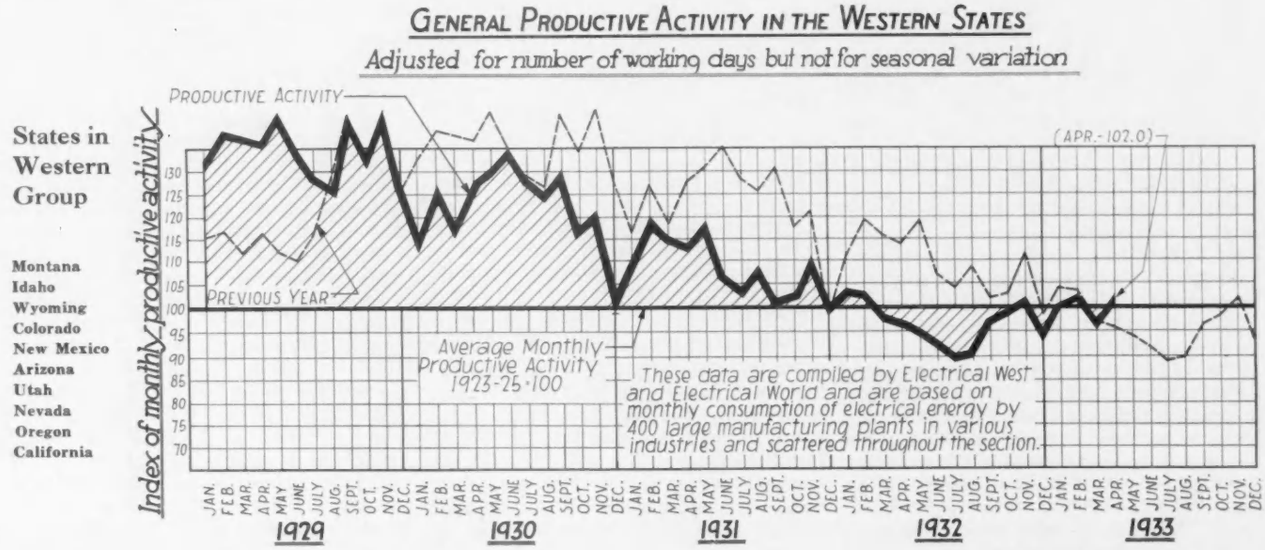
Only stone, clay and glass is lower than in March, but there was an unusual construction spurt in that month. The gain in metals is especially pronounced. The outlook is bright.

Indexes of Manufacturing Activity in the Western States

(All figures adjusted for number of working days)

	April 1933	March 1933	Feb. 1933	April 1932
All industry	102.0	95.8	102.0	96.2
Chemicals	78.0	71.9	79.8	82.7
Food	122.1	108.3	118.2	114.8
Metals group	50.3	45.4	44.8	38.0
Forest products	137.8	136.7	144.8	128.0
Paper and pulp	130.0	111 0	127.0	134.0*
Rubber	56.2	27.9	46 8	99.0
Shipbuilding	105.4	96.3	122.3	100.7
Stone, clay and glass	89.9	109.3	83.7	96.6

* Revision



Contractor Dealer Inspector

Los Angeles Has Electric Appliance Exposition

Eighty-five displays of manufacturers, jobbers and retailers, showing the latest in ranges, refrigerators, radios and other major electric appliances, were included in an exposition held in Shrine Auditorium, Los Angeles. The show opened on May 14 for a trade preview and was thrown open to the public on May 15, 16 and 17.

Dealers were supplied window decorations and admission tickets for distribution to customers. A radio broadcast studio was constructed and programs broadcast as an added attraction. Also, an exhibition of television was provided to visitors. Home economists from three newspapers gave demonstrations and radio talks.

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HINK'S Department Store, Berkeley, Calif., has added a new household department in the basement. Formerly, the appliances, under the management of Julian Carash, were located on the mezzanine floor near the offices. In the new basement display room much more ample quarters are provided and an auditorium for the holding of cooking classes is included. It was opened on its initial week by Mrs. Mary Dowd Reardon. The downstairs department features washers, radio, ironers, refrigerators and small appliances. A second store, featuring appliances only, is maintained across the street on Shattuck Ave.

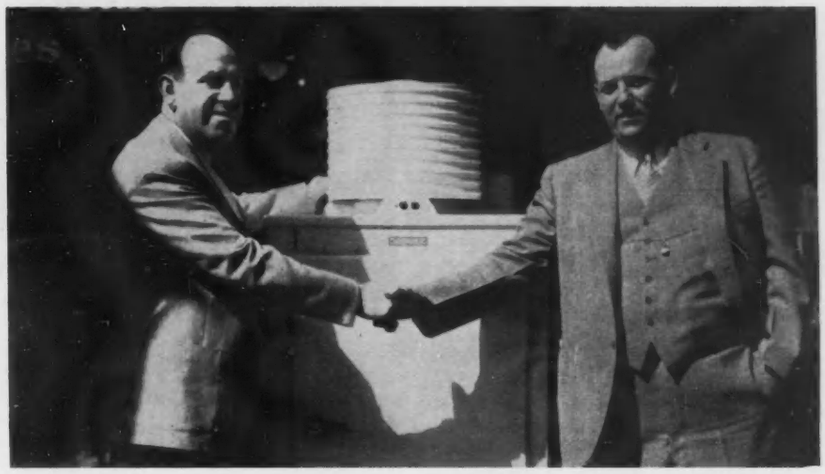
L. F. KING has taken over the complete store of the King-Russell Co., in San Jose, Calif. The company is now known as King Electric Co. and retains the original location at 101 East San Fernando St. Mr. Russell has gone into the contracting business alone. King Electric Co. retains an attractive merchandising display in addition to contracting business.

JOSEPH BARRACLOUGH, owner of the largest grocery business independently operated in North Vancouver, B.C., has entered the electric and radio field, opening a department to handle these lines at 201 Lonsdale Ave., North Vancouver.

DESERT ELECTRIC CO., formerly operated by C. V. Knupp and R. W. Fairnie in Palm Springs, Calif., has been taken over by the former. Mr. Knupp, who has operated a contracting shop in the desert town for nine years, has moved into a new store on North Palm Canyon Drive.

ROY BUTCHER, electragist, San Jose, has the wiring contract for the new San Jose post office.

San Jose Monitors



NEWLY-ORGANIZED in San Jose, Calif., to take over the distribution of General Electric refrigerators, range and home appliances in that city, Koerber-Thompson, Inc., has consolidated its activities from one store at 209 So. First St. George M. Thompson, vice-president and manager of the new firm, for the last six years was San Jose branch manager for The L. H. Bennett Co., Ltd., which had been the distributor in the city. Previously, he had been in the electric appliance business for twelve years. W. L. Koerber, president, has been in the wholesale tobacco business as owner of Koerber-Holtum Co., and is president of San Jose Finance Co. In the picture, Mr. Koerber is on the left, Mr. Thompson on the right.

Besides selling the G-E equipment, the firm will design, manufacture and sell all types of commercial and cold storage equipment incorporating G-E refrigerating units.

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ALTA Electrical & Mechanical Co., Inc., received the contract for wiring the new San Francisco county jail, located at Sneath Ranch, San Mateo County. The jail property contains a seven-story men's building and a two-story women's building.

W. B. DANIELSON, merchandise specialist of Redlands, Calif., has moved into larger quarters there in the Foy Theater building, where he carries a full line of Westinghouse appliances and RCA-Victor radios.

RALPH W. WILEY, chief of the department of electricity, San Francisco, was appointed by D. J. Talbot, chairman, as a member of the national transportation committee for the world's fair meeting of the International Assn. of Electrical Inspectors, Sept. 11-15. Mr. Wiley has sent out letters to members of the I.A.E.I. advocating effort on the part of the inspectors to obtain assistance from their city governments to attend the meeting.

C. L. BADT has just opened a new store for the sale of home utilities and household goods at 123 Post St., San Francisco.

BERT DOHERTY, San Francisco electrical contractor, has installed an unusual garden lighting installation at a Red Seal residence in Bayside Hills.

COMMERCIAL Electric Co. has moved from 435 Van Ness Ave. to 435 Northwood Drive, San Francisco.

Building Owners Liable For Defective Wiring

An award of $20,000 to the widow of a plumber who was electrocuted while making plumbing repairs in the basement of a San Diego store again establishes the liability of a building owner for danger to life or property from unauthorized and defective wiring. The plumber was clearing stopped sink sewer lines; an old extension cord has been used to connect a compressor, the cord hanging over a steam pipe and leaving a loop near the floor. Bare spots in the insulation were exposed near the bottom of this loop. The plumber was dragging the snake wire through some water on the floor when the snake contacted the cord and killed him.

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H. M. JACOBS, pioneer electrical contractor-dealer of Santa Rosa, sells garden trellises and bulbs in his store on B St. The trellises, decorated with flowers at times, brighten up the store and attract customers to it. The side line has been responsible for the sale of many electrical appliances, and some garden lighting, too.

ERSKINE & PREBLE, specializing in G-E appliances, have moved into new quarters at 1461 Main St. El Centro, Calif.

HILL ELECTRIC Co. Ltd. has been opened by W. Hill as a retail and electrical contracting business at 539 Homer St., Vancouver, B. C.

Personals

W.R. Marshall Advanced By Westinghouse

W. R. MARSHALL, manager of the Westinghouse Electric & Mfg. Co.'s Pacific Division, has been advanced from commercial vice-president to full vice-president, it was announced during the month. He has held the commercial vice-presidency since 1930, the present honor coming in his twenty-fourth year of service with Westinghouse.

Formerly district manager for the company at Pittsburgh, Mr. Marshall was transferred to San Francisco as Pacific manager in 1928. His duties with the company have carried him through many branches of its operations and he has served in various departments at Pittsburgh, New York and Buffalo, previous to his transfer West.

Long prominent in industry circles, Mr. Marshall has been a member of the executive committee, P.C.E.A., and is a director of the San Francisco Electrical Development League.

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George Ward Honored By Engineers' Club

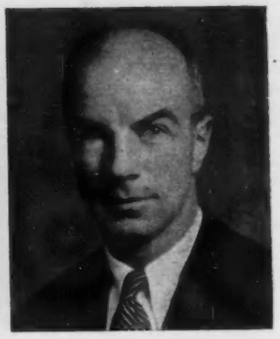
George C. Ward, president of Southern California Edison Co. Ltd., was honored by the Los Angeles Engineers' Club on May 2, when he was presented with a certificate of honorary life membership in recognition of his many accomplishments in the field of engineering. The presentation was made by Charles S. Howe, president of the club, in Mr. Ward's office in the Edison building.

Builder of the Edison company's hydro-electric generating system in the high Sierra of central California, with its large water storage reservoirs, tunnels, conduits, dams, generating stations and hundreds of miles of transmission lines, Mr. Ward has been awarded honorary degrees by the University of Southern California and Oberlin College and has received recognition from the United States Chamber of Commerce. The latter organization awarded him a bronze medallion in commemoration of the completion on February 18, 1925, of the Florence Lake Tunnel, the Key project of the company's Big Creek-San Joaquin Valley electrical development.

Other engineering projects of an earlier date that also were of importance to the development of southern California, in which Mr. Ward was one of the leading figures, included construction of the Los Angeles Railway and Pacific Electric Railway systems. In these projects he was associated with Henry E. Huntington as engineering advisor and it was in this capacity and while seeking new sources of electric power for the Los Angeles area that he took the first steps that led to the spectacular construction projects in the high Sierra and the bringing of electric power to Los Angeles over the longest high-voltage transmission line the world had known.

W. R. MARSHALL

A. G. WISHON



JAMES B. BUMAN

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A. G. Wishon Awarded Missouri Degree

A. G. WISHON, former president and chairman of the board of San Joaquin Light and Power Corp., and dean of the electric light and power industry of California, has been voted the degree of Doctor of Engineering, Honoris Causa, by the board of curators, School of Mines and Metallurgy of University of Missouri, for his contributions to electrical development in this section.

Mr. Wishon once attended the Missouri school, although he did not graduate from there. He came to Tulare, Calif., in 1889, and from that date his history is an endless chain of achievements. He made what is thought to be the first application of electric motors to irrigation pumping; he conceived the idea of pumping natural gas from the oil wells of San Joaquin Valley into southern California; he constructed two of the first steam plants to burn natural gas under the boilers; it was his inspiration mostly that has made the farms of California pre-eminently electrified, his vision and resourcefulness that has reclaimed much fallow California land and brought it under intensive cultivation. It was for these and other contributions that the doctorate was conferred upon him.

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R. STUART SMITH, credit manager for Northern Electric Co., at Vancouver, B.C., has been appointed president of the B.C. Division of the Canadian Credit Men's Trust Assn. Ltd., for the 1933-34 term. Mr. Smith is a native of Boissevain, Man., and joined the Northern Electric at Vancouver late in 1928.

NINA J. LEONARD and Elizabeth Edmonds, the first two Southern California Edison Co. women to receive 25-year's service buttons, were honored by the Edison Women's Committee at the May meeting.

C. R. BEAN, Northwest district purchasing agent, Graybar Electric Co., Seattle, has been elected president of the Purchasing Agents' Assn. of Washington.

James Buman Heads Portland Electric Club

JAMES B. BUMAN, appliance sales manager, Northwestern Electric Company, was elected president of the Electric Club of Portland at the annual meeting last month, succeeding Berkeley Snow, who had held that position for the past year. Other officers are: vice-president, Fred D. Weber, Oregon Insurance Rating Bureau; secretary, A. B. Carlon, Stubbs Electric Co.; treasurer, Harold Parrott, Morrison Electric Co.; sergeant-at-arms, J. H. Lake, Electricians' Union. Members of the executive committee elected were: S. G. Ward, Graybar Electric Co.; L. W. Going, city electrical inspector; and J. B. Kilmore, Pacific Power & Light Co.

At the first meeting of the executive committee, chairman of the standing committees were appointed as follows: membership, J. F. Reinke, Incandescent Lamp Department of G-E Co.; program and entertainment, Orr E. Crites, Portland General Electric Co.; attendance, Guy E. Davis, Pacific Power & Light Co.; reception, A. M. McLean, electrical inspector; publicity and historian, C. T. Hurd, Jobbers Supply Co.; golf, Y. C. Bressie, Sunlite Electric Co.

The club has inaugurated a monthly bulletin for members, now issued in mimeograph form, with Phil B. Perkins, Northwestern Electric Co., editor. The annual spring golf tournament is scheduled for June 16.

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Lester Ready Will Survey Pasadena Light Department

Employment of Lester S. Ready, former member of the California State Railroad Commission and a former chief engineer of the commission, to make a study of the Pasadena, Calif., municipal light and power department, looking toward the establishment of a ten-year plan of development, has been authorized by that city's board of directors. Mr. Ready recently assisted a Pasadena citizens' committee when a survey of the department was made in connection with the allotment of $200,000 of department funds for unemployment relief purposes.

"We believe the study should be approached with the view to establishing

a ten-year program for the light department, including its entire budget program, its future needs, extensions and betterments, its allowances for depreciation and charges to be made by the department in its relationship with other departments of the city," J. W. Charleville, city manager, said.

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Fred Norcross Leaves Home Electric

Fred Norcross, president of the Rocky Mountain Electrical Assn., has left the Home Gas & Electric Co., Greeley, Colo., of which he had been manager for 19 years. While his plans have not been announced, it has been indicated that he will continue as a part of the electrical industry. He remains as president of the association and has just been appointed vice-chairman of the association's Electrical Week committee.

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AN ATTACK of acute indigestion, which in turn affected his heart, will result in Frank E. Weymouth, chief engineer and general manager of the Metropolitan Water District of Southern California, taking an enforced vacation of several weeks on doctors' orders. Mr. Weymouth was taken to the Good Samaritan Hospital in Los Angeles on May 1, following an attack suffered in his office. It was found necessary to summon a pulmotor squad from the fire department to aid in reviving him. Mr. Weymouth's physician said that overwork was the cause of the attack.

WALTER C. SMITH, General Electric Co., was elected chairman of the San Francisco Section, A.I.E.E., in the balloting which took place in April. With Mr. Smith were elected A. M. Bohnert, Ohio Brass Co., as vice-chairman; and E. M. Wright, Pacific Gas and Electric Co., as secretary. On the executive committee will be: W. A. Hillebrand, University of California; G. H. Hagar, Pacific Gas and Electric Co.; L. J. Moore, San Joaquin Light and Power Corp.; and Stanley Rapp, Pacific Telephone and Telegraph Co. Mr. Smith served during the past year as vice-chairman of the section.

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Eugene Ramsay Resigns Advertising Post

EUGENE P. RAMSAY, "Gene" to most, has resigned from his post as advertising manager of the Los Angeles Gas and Electric Corp. to become the Ramsay member of the firm of Gaynor and Ramsay, authorized dealers in the southern California territory for the Electrolux gas refrigerator and other gas appliances. The firm opened headquarters on May 1 at 723 West Eighth St., Los Angeles. Sidney B. Gaynor, partner in the new dealership, was for four years assistant advertising manager for the Southern California Gas Co. "Gene" was advertising manager for the Los Angeles Gas and Electric Corp. for ten years, and for many years has been active in the affairs of the Pacific Coast Electrical Assn. He was chairman of the Advertising-Publicity Section in 1931-32.

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DR. LILLIAN GILBRETH, of Montclair, N.J., famed Eastern engineer, visited San Francisco during May. Wife of the late Frank Gilbreth, who was one of the leading apostles of Dr. Frederick Taylor, she has been carrying on his work in factory planning and efficient management. Among her latest applications of Dr. Taylor's time- and motion-study principles is the design and layout of model kitchens which will simplify the work of the housewife. Four of her model kitchens have been installed by the New York "Herald-Tribune" Institute, one by the Narragansett Lighting Co., of Providence, R.I., and one by the Brooklyn Borough Gas Co.

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A.O. Austin Resigns From Ohio Insulator Co.

Arthur O. Austin has resigned as vice-president of The Ohio Insulator Co., division of The Ohio Brass Co., to establish a practice of consulting engineering, with the latter company as one of several clients. Graduated from Stanford University in 1903, Mr. Austin served about a year with General Electric Co. and another year with Pacific Gas and Electric Co. as an insulator inspector. Since 1905 he has been associated with manufacturers of insulators, since 1910 with Ohio Brass.

William A. Smith, also a former P. G. and E. insulator inspector, has been appointed chief engineer of the insulator company to succeed Mr. Austin.

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Ben Maddox, Pioneer, Dies in Los Angeles

Ben M. Maddox, of Visalia, Calif., manager of the San Joaquin Valley division of Southern California Edison Co. Ltd., and a pioneer electric utility executive in central California, died unexpectedly May 9 at Los Angeles. He was 74 years of age. His death, attributed to a heart attack, occurred at the hotel where he was staying during a meeting of Edison company officials.

In 1889-1900, Mr. Maddox, in association with A. G. Wishon and the late John Hays Hammond, organized the Mt. Whitney Power Co. to serve the towns of Visalia, Exeter, Lindsay, Tulare and Porterville. The company was a pioneer in the utilization of the water resources of the Sierra Nevada mountains of central California for power purposes. In 1920 the property, then known as the Mt. Whitney Power and Electric Co., was absorbed by the Edison company and became a part of the Edison system. Mr. Maddox became resident manager at Visalia and more recently was named resident division manager of the company's entire San Joaquin Valley territory.

Mr. Maddox, affectionately known as "Uncle Ben" to Edison company employees, had lived in Visalia for 43 years. Coming to California as a youth seeking adventure, he first lived at Bodie, then a booming mining camp. He later lived at Mariposa, where he was editor and publisher of the Mariposa "Herald," one of California's oldest newspapers. In 1890 he purchased the Tulare County "Times" at Visalia and published it as a daily newspaper until his entrance into the utility business.

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C.E. Doolittle Dies In Glendale

Clarence Everett Doolittle, consulting hydro-electric engineer and father of F. B. Doolittle, radio engineer for Southern California Edison Co. Ltd., died on April 29 at his home in Glendale, Calif. Seventy years of age, he had been in the electrical industry for 48 years, since his graduation from Cornell University in 1885.

After a year in the East, following his graduation, Mr. Doolittle came to Aspen, Colo., as electrical engineer for The Aspen Electric Co. Through a merger of his company, he became electrical engineer for The Roaring Fork Electric Light and Power Co., which in 1887 installed two 40-kw. generators for incandescent lighting, making Aspen the first town in America to have its dwelling houses as well as its streets and business houses lighted by electricity from water power. To solve the problems of his company, Mr. Doolittle invented several devices, among which was the "Doolittle Differential Governor."

He became vice-president and general manager of the company and remained until 1905, when he went to Chile to install hydraulic equipment. He returned a year later and made his home in Aspen until 1923, when he was forced by ill health to retire from active practice and moved to Glendale.

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MAJOR Robert Samuel Hardy, wartime director of Niagara Falls power distribution, and more recently assistant general manager of the Niagara, Lockport and Ontario Power Co., at Buffalo, N. Y., died May 2 at his home in Los Angeles. He was 59 years of age. Major Hardy was born in Bangor, Me., and was graduated from the Massachusetts Institute of Technology with honors as an electrical engineer in 1896. In 1904 he came West and took a position on the engineering staff of the Los Angeles Gas and Electric Corp. He remained with the corporation until the United States entered the World War, when he enlisted, received the rank of captain and, after training at Fort Leavenworth, Kan., was sent to Buffalo to direct power distribution. He became assistant general manager of the Niagara, Lockport and Ontario Power Co. in 1919. Illness forced his retirement about four years ago.

Manufacturer Distributor

Western "Legion of Honor" Winners Named

THREE Western men have been given silver loving cups as regional winners in National Electric Refrigeration Bureau's "Legion of Honor" contest, which closed April 15. J. Clark Chamberlain, secretary-manager, San Diego County Electric Refrigeration Bureau, in the Pacific division; R. B. McElroy, merchandise sales manager, The Washington Water Power Co., in the Northwestern division; and J. E. Flynn, merchandise manager, New Mexico Power Co., Santa Fe, in the Rocky Mountain division, were those honored. In the Northwestern division, honorable mention was given to R. E. Folland, executive secretary, Electrical League of Utah, Salt Lake City.

In making their decisions, the three judges pointed out that:

The San Diego Bureau, creature of Mr. Chamberlain's ability as an organizer and administrator, has 100 retail outlets in membership, all tied solidly together by weekly meetings and a highly-informative weekly bulletin edited by the secretary-manager. Mr Chamberlain also is responsible for constant newspaper publicity which keeps San Diego probably the most refrigeration-conscious community in the entire United State. Moreover, three times daily there are pithy 30-word messages broadcast from a local radio station. Almost daily talks before business and civic organizations also are a part of Mr. Chamberlain's self-imposed routine, and he is making regular appeal to the mothers of the community through 62 parent-teacher organizations.

Mr. McElroy has the distinction of being probably the original pioneer in local refrigeration bureaus, having started one in Spokane in April, 1926, and having served ever since as its chairman. His cooperative activity has been constant and effective and includes the promotion of unusually-successful shows in 1931, 1932 and 1933.

Four years ago, Mr. Flynn started ploughing a virgin field. The inhabitants of Santo Fe knew little about electric refrigeration, and cared less. He personally persuaded five of the present dealers to install their lines and secured the dealerships for them. From nothing, he, himself, built up the trade and the cooperation of the various dealers to a point where, this year, they put on a refrigeration show in conjunction with the New Mexico Power Co.'s cooking school. The show attracted 1,300 visitors in three days.

J. CLARK CHAMBERLAIN
Pacific Division Legionnaire

R. B. McELROY
Northwestern Division Legionnaire

J. E. FLYNN
Rocky Mountain Legionnaire

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Exhibit Refrigerators and Ranges in Theater

A combination electric refrigerator and range exhibit was put on by the Electric Refrigeration & Cookery Council of Oregon at the R.K.O. Orpheum Theater, Portland, May 8-15. The mezzanine lounge of the theater was used for the exhibit, and during the eight days it is estimated that 5,000 people visited it. A feature was the prize drawing in which the Council offered a first prize of $100 and a second prize of $50 credit on the purchase at standard retail prices of any model of refrigerator or range on display. Upward of 3,000 coupons were deposited in the sealed container during the week.

Eight distributors showed the following lines: refrigerators—Frigidaire, General Electric, Graybar, Kelvinator, Majestic, Norge, Westinghouse; ranges —A.B., Hotpoint, L & H, Monarch, Westinghouse. Simple backgrounds and special lighting effects were permitted, and signs giving the name of the distributing company, its products and its Portland dealers were made uniform in size and style. The displays were manned during the afternoon and evening by representatives of dealer firms handling the lines, but no active selling was permitted.

Arrangements with the theater provided for the payment of rental for the space with which the Orpheum gave a number of complimentary tickets to its show to the number of 2½ per $1 of rental. These tickets were pro-rated to the participants on the basis of the amount of space each took, and in turn were given to dealer organizations to be handed out to prospects.

The Orpheum also advertised the exhibit in its regular theater advertising, running a screen trailer, and displayed foyer and outside signs calling attention to the exhibit on the mezzanine lounge. Members of the Council ran mention of the exhibit in their own advertising both in the newspaper and over the radio, and card signs were displayed in the dealers' stores and windows and on street cars. One special page of newspaper advertising announcing the opening of the exhibit was made up of a center section by the Council, surrounded by tie-in advertisements of some of the dealers.

The total expense to the Council ran to less than $1,000 and this was met by the sale of display space and by contributions from the Portland General Electric Co. and Northwestern Electric Co.

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Kelvinator Enters Oil Burner Field

Kelvinator Corp. went into production May 24 with a new type of perfected oil burner for home heating to be distributed largely through the company's existing sales organization, it was announced by George W. Mason, chairman of the board and president.

Addition of an oil burner to the Kelvinator line follows several years of experimental work and testing of burners of various design, it was announced. Tooling up for production was started only after a burner was developed which Kelvinator engineers feel meets fully the needs of modern home heating.

"The manufacturing and sale of oil burners fits in exceptionally well with our program and will do much to smooth out the seasonal production and sales curves which always accompany any exclusively refrigeration operation," Mr. Mason said in explaining the new move.

Present plans call for sale of the new Kelvinator oil burner through distributors in a limited number of selected key cities during this year. No effort will be made to get national distribution for the new product until a year of merchandising experience has been passed through and future merchandising policies set.

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LINE MATERIAL CO., San Francisco, has just been appointed representative for northern California, Nevada and the Hawaiian Islands for Penn-Union Electric Corp., Erie, Pa., manufacturers of bakelite terminal blocks, solderless connectors, conductor fittings and devices.

F. G. B. WHITEHEAD, British Columbia representative of Consolidated Industries Ltd., Canadian manufacturers of De Forest-Crossley radios, Norge refrigerators and Hammond clocks, has been transferred to Winnipeg.

THREE changes of addresses in Denver include: Arthur E. Bacon, to 1863 Waxee St.; James H. Blinn Co., to 1708 Sixteenth St., and Diamond Electric Mfg. Co., to 724 W. Colfax St.

Westinghouse X-Ray Machine in West

An x-ray machine which takes pictures of the body at a speed of 1/100 sec., thereby stopping all movement, was demonstrated at the Children's Hospital, San Francisco, during May. According to F. M. Hoben, of Westinghouse X-Ray Co., manufacturers, who was in charge of the demonstration, this is the first machine made in America using condensers for taking the pictures. The ordinary machine requires 1/10 sec. for a picture.

The x-ray tube carries a charge approaching 4,000 miliamperes, 80,000 volts, and can be operated from an ordinary outlet.

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KELVINATOR Corp, with the shipment of 30,116 units in April, reports the biggest month in nineteen years. This is a 47-per cent increase over April average for past five years, and beats the all-time record set in April, 1932, when 25,427 units were shipped.

GEORGE S. WEST, district sales manager in the eleven Western states and parts of So. Dakota, Nebraska and Texas for General Electric Co. merchandise division, has disclosed the new organization in his district. Under Mr. West in the Mountain territory is E. W. Brown, with headquarters in Salt Lake City, covering that city and Denver and Butte, handling radio and traffic lines. C. J. Anderson, in Seattle, handles radio and traffic lines. Roy M. Loughery handles the same lines in Portland and Spokane. With headquarters in San Francisco, covering northern California and western Nevada, are J. J. Burns and S. H. Winter, who work on all the traffic lines. In Los Angeles are J. P. Bowden and G. H. Harker, who also handle traffic lines. C. W. Griffen works exclusively on radio, covering all of California.

H. L. MILLER CO., Pasadena, Calif., one of the city's pioneer electrical shops, was awarded first prize recently in a window display competition held under the auspices of the Pasadena Junior Chamber of Commerce. F. T. Hoover, president of the company, received the trophy cup for his firm. The prize window was trimmed by H. W. Ellis and M. F. Simmons.

THOMAS A. EDISON, Inc., has appointed J. J. Schaller Co., Los Angeles, and Kaemper Barrett Corp. Ltd., San Francisco, as representatives for the Edicraft line of appliances.

JOHN S. LAPP, president, Lapp Insulator Co., recently motored to the Pacific Coast on a honeymoon trip.

ALLIED Industries, Inc., has been named as California, Oregon, Washington, Nevada and Arizona representatives for Folmer-Chapin Corp., Rochester, N. Y., manufacturers of "Insekiller."

MONTGOMERY BROS., San Francisco, Portland and Seattle, have become Western agents for the commercial electric cooking line, including the new "Quick-Fry" deep-fat fryer, of Belmont Enameling & Stamping Co., New Philadelphia, Ohio. The firm also has been appointed distributors in all Western states for John Wood Co., Conshohocken, Pa., manufacturers of "Thermowatt" full-automatic plain storage type and "Hotsprings" full-automatic circulating type electric water heaters.

H. L. PERCY has become Rocky Mountain District manager for Kelvinator Corp., succeeding the late William B. Milliken (EWEST, March, 1933, p. 111).

F. W. GORMAN, El Paso, Texas, has been appointed by Pacific Electric Mfg. Co. as representative in Old Mexico, New Mexico and western Texas.

ALBERT S. KNIGHT CO., Seattle, has been appointed Oregon, Washington, Idaho and Montana representative for Hexacon Electric Appliance Corp., Roselle Park, N. J.

F. W. JORDAN, formerly sales engineer at the Butte, Mont., office of the Westinghouse Electric & Mfg. Co., has been appointed district supervisor of air conditioning sales for that company, with headquarters in San Francisco. In addition to the three Pacific Coast states, Mr. Jordan's territory will include Arizona, Utah, Idaho and Nevada.

Since the first of the year he has been preparing for the new appointment in the newly-formed air conditioning division of the Westinghouse company at its headquarters in Pittsburgh, Pa.

SALT LAKE CITY representatives of air conditioning manufacturers, and others interested, have organized an air conditioning bureau for educational work in and around Salt Lake City. H. M. Ferguson, assistant to the vice-president and commercial manager of Utah Power & Light Co., is president; J. F. McAllister, sales department, Utah Power & Light Co., is secretary; and Mitchell Stewart, secretary-treasurer of F. S. Murphy & Co., is treasurer. Mr. McAllister will be public contact man to engage in promotional activities in cooperation with bureau members.

THE SAN DIEGO, Calif., Refrigeration Bureau has inaugurated a campaign of direct appeal to the mothers. In addition to running an advertisement on the back cover to the Parent-Teachers Assn. publication, Secretary-Manager J. C. Chamberlain has arranged to give a series of talks on electric refrigeration to the various P-T-A groups at their regular meetings.

FRANK HURST, Line Material Co., San Francisco, announces that Roller-Smith Co. has just produced catalog No. 48, covering their entire line of switchboard and panelboard instruments.

Air Conditioning Unit Employs Reverse Cycle

The De La Vergne Engine Co. has introduced a self-contained air conditioning unit which employs the compression refrigeration cycle for cooling and dehumidifying and the De La Vergne reverse refrigeration principle

De La Vergne unit in typical installation

for warming and humidifying. To change it from a heating to a cooling unit requires only the turning of a lever.

The compressor, a two-cylinder opposed vertical shaft unit directly-connected to a 2-hp. motor, has a refrigerating capacity equivalent to 1½ tons of ice meltage in 24 hours. It circulates air at the rate of 604 cu. ft. per minute.

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G.E. OFFICIALS, headed by Mayor L. Funk, of Spokane, Wash., officially opened the all-electric traveling kitchen of the G.E. Supply Corp. for The Washington Water Power Co. in Spokane on May 4. R. B. McElroy, merchandise sales manager, arranged the plan for the display of the traveling kitchen in various residential districts in the city.

Attending their annual dealers' meeting, 125 retailers of General Electric refrigerators throughout the western Washington territory met in Spokane on April 5. George Ruck, Pacific coast manager, refrigeration department, and J. M. Walker, representative of the refrigeration department, General Electric Co., Cleveland, were principal speakers. August Lutz, district manager of the General Electric Supply Corp., presided, assisted by Dan Miller, manager of the local refrigeration department.

COMBINED cooking and refrigeration schools were held in nine principal Oregon cities, outside of Portland, by the Electric Refrigeration and Cookery Council of Oregon during April and May. In each city the school and exhibit ran for one week.

GRAYBAR ELECTRIC CO., Inc., on April 1 began the distribution of the Graybar Ilg-Kold electric refrigerator, manufactured in Chicago. The equipment comes in seven models.

New Products

Bonair Fan

Century Electric Co., St. Louis, Mo., has announced the illustrated fan in a two-tone brown steel cabinet, with screen to provide protection from blades. Motor inside cabinet is 2-speed induction type, built for 50 or 60 cycles a.c., any commercial voltage. Oscillation may be secured through control lever at back.—Electrical West, June, 1933.

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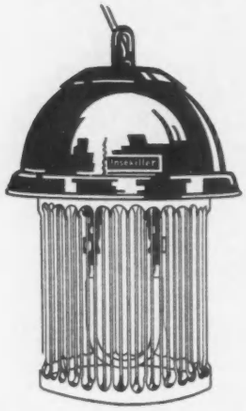
Insect Killer



Folmer-Chapin Corp., Rochester, N. Y., is marketing the Insekiller, an electric appliance to electrocute bugs and insects. Made in various sizes, with either Mazda lamp or mercury vapor tube to attract the insects, which contact vertical tubular bars and are electrocuted. Made for 110 volts, 25 or 60 cycles. Also comes in screen for protection of dairies, etc. Lowest-priced model Insekiller (K), lists at $16.—Electrical West, June, 1933.

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Midget Relay

For use with mercury vapor rectifier tubes, a midget time-delay relay, the thermal time element of which has an adjustable range of 15 to 45 sec. operation, is a product of Ward Leonard Electric Co., Mount Vernon, N. Y.—Electrical West, June, 1933.

Sunlamp Timer

General Electric Co. has an automatic timer for sunlamps. No larger than an inkwell, automatically shuts off sunlamp at any interval from 1 to 30 minutes.—Electrical West, June, 1933.

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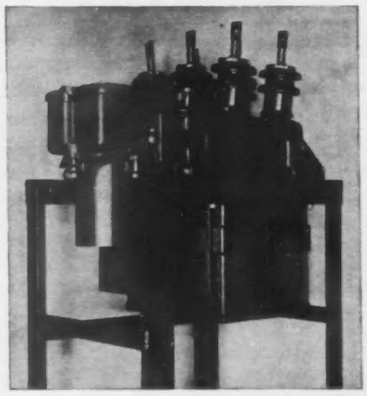
Reclosing Breaker



Westinghouse Electrical & Mfg. Co. announces a self-contained reclosing equipment for lightly-loaded or rural feeders. Equipment incorporated in type FO-22 breaker, 7,500 volts, with 50,000-kva. interrupting capacity rating. Breaker is solenoid-operated from a.c. source by means of a rectox. Equipment built for pole-mounting, but can be floor-mounted. —Electrical West, June, 1933.

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Airmaster Fan

Chicago Flexible Shaft Co., Chicago, has added to its line a Sunbeam Airmaster 10-in. oscillating fan. Features: 12-in. air displacement, no radio interference, base adjustment for tilting, noiseless operation. Chromium-plated blades, patented shape. Retail price in West, $12.95.—Electrical West, June, 1933.

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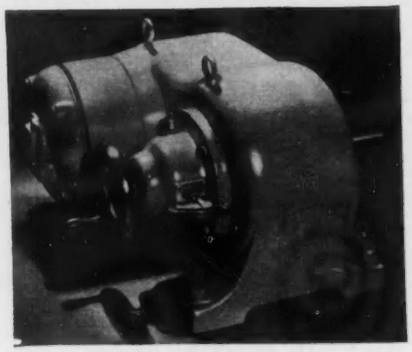
New G-E Cable

General Electric Co. has developed a cable insulated with Glyptal-treated cloth and capable of resisting oil and withstanding high temperatures. Unusual flexibility and toughness claimed. Glyptal is a synthetic resin, especially suitable for this work. Cable can be used wherever oil-resisting, heat-resisting cable is required.—Electrical West, June, 1933.

Varidrive Motor

U. S. Electrical Mfg. Co., Los Angeles, announces the Varidrive motor, consisting of a squirrel-cage motor and a variable-speed differential which comprises dual disks which reciprocally expand and contract for higher and lower speeds. Speed may be changed quickly by local or remote control while motor operates. Speed variations as fine as 1 r.p.m. may be made through a micro-speed adjustment.—Electrical West, June, 1933.



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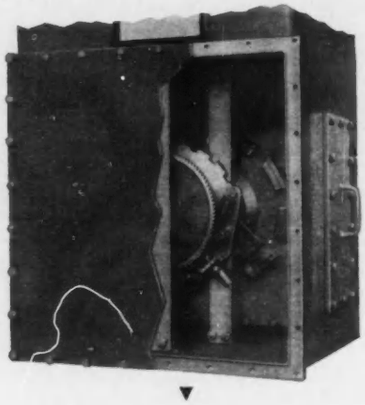
Feeder Regulator

Allis-Chalmers Mfg. Co., Milwaukee, has a new-type automatic feeder voltage regulator for applications where induction type of regulator has been used heretofore. Operates on basis of automatic tap-changing device with suitable transformers, all built into compact unit. Suitable for indoor or outdoor application and for single- or three-phase operation. Manufacturers claim it can be used on higher operating voltages than those for which induction regulator can be designed economically. — Electrical West, June, 1933.



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Everhot Casserole

To the Everhot line of Swartzbaugh Mfg. Co. is added a 2¾-qt. electric casserole with pyrex baking glass top. Fully-insulated body of green enamel, trimmed in black. Two heats, 360 watts on high and 120 watts on low. Underwriters'-approved cord and plug included. Model shown (EC-7) handles 4-lb. roast. Two other models offered, one (EC-9) with Everhot broiler and fryer.—Electrical West, June, 1933.

SUPPLEMENT

Committee Reports

Northwest Electric Light and Power Association

1932-1933

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Economics Section

*Employees' Bureau**

EMPLOYEE TRAINING COMMITTEE

A SURVEY was conducted during the past year among twelve member companies of Northwest Electric Light & Power Assn. to determine the extent to which employee information programs were being conducted. The inquiry was directed toward determination of group or "mass" informational activity, similar to the program sponsored by National Electric Light Assn., rather than espousal of individual vocational training or study.

Replies were received from ten of the twelve companies to whom questionnaires were directed. Results of the replies were tabulated by companies. A brief analysis of the survey reveals the following facts:

1. All reporting companies had instituted programs.
2. A total of approximately 5,250 employees were reached.
3. All companies were using or had used the N.E.L.A. pamphlets as basic material.
4. Seven of the companies had employed supplemental material with the N.E.L.A. pamphlets.
5. Eight reported the employee reaction good, one fair, and but one reported the employees to have lost interest before completion of the program.
6. Nine reported executive officer reaction good, and but one company reported a negative attitude.
7. Only two companies definitely report that such an informational program will not be continued. Three report a continuation of the plan, based on material of their own origin. The remaining five companies either plan to continue but have no immediate plans formulated, or are doubtful as to policy.

Supplemental and original material employed by member companies consisted for the most part of individual company historical data, information on valuation proceedings, analysis of proposed legislation and discussions on franchises and rates. One company used Richard T. Ely's "Research Monographs," while another used "A Primer on the Electric Light and Power Industry," compiled by A. F. Tegan, of Milwaukee Electric Railway & Light Co., and adjudged winner of the Henry L. Doherty prize for 1931.

The most extensive informational plan has been carried on by Utah Power & Light Co. under direction of Dr. A. S. Bennion. Originally, the N.E.L.A. pamphlets were employed with supplemental material of their own origin compiled in pamphlet form and under captions of "Utah Power & Light Company and You" and "Shall We Sing a New National Anthem?" The last-named topic dealt with a number of economic questions bearing on the utility industry.

It appears generally that where executive officer interest in the program was good, the employee attitude was likewise good. There was but one instance where employee interest failed when the executives were reported favorably disposed. Also, there was but one instance where employee reaction is reported fair when the executive attitude was negative. This may lead logically to the conclusion that success of any plan of employee training was dependent upon the interest and attention given by officials of the company and the consequent manner in which the program was handled.

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* Report of the employees bureau, Economics Section, George T. Bragg, Pacific Power & Light Company, chairman.
The California Oregon Power Co.: T. G. Bradley.
Eastern Oregon Light & Power Co.: Miss A. Gyllenberg.
Grays Harbor Railway & Light Co.: F. W. Linklater.
Idaho Power Co.: E. C. Kiersted.
Mountain States Power Co.: R. C. Sipe.
Northwestern Electric Co.: George H. Wisting.
Portland Electric Power Co.: C. P. Osborne.
Puget Sound Power & Light Co.: General H. G. Winsor.
Utah Power & Light Co.: Dr. A. S. Bennion.
The Washington Water Power Co.: W. H. Ude.

EMPLOYE EDUCATIONAL COURSES COMMITTEE

A letter was addressed personally to executive heads of member companies requesting appointment of a representative from the respective organizations to serve on the employees' bureau and to whom information should be directed regarding employee educational courses. Replies were received from ten of the twelve companies addressed.

A supply of circulars descriptive of the N.E.L.A. educational courses was obtained from the chairman of tne national committee. A circular letter, together with a supply of printed folders and bulletin board posters, was directed to the appointed company representatives calling attention to availability of the courses. This soon brought forth several inquiries from member companies as to the status of the educational activity and disposition to be made in instances where employees were studying such courses, following the then-impending dissolution of National Electric Light Assn. No specific inquiries regarding the courses have been received. Whether the aforementioned situation had any bearing on the lack of interest is doubtful.

A letter dated April 22, 1933, was received from Fred R. Jenkins, former chairman of the N.E.L.A. Employee Educational Committee, announcing that Chicago Central Station Institute had taken over the N.E.L.A. courses, including the copyright, and will conduct them just as they have been in the past, as well as assuming responsibility to present subscribers. Mr. Jenkins is designated as manager of the Institute. Information to this effect has been furnished all member companies by circular letter.

WOMEN EMPLOYEES' COMMITTEE

In accordance with the plan suggested, a women employees' committee was organized under the chairmanship of Marguerite Butler, Pacific Northwest Public Service Co., who was also a member of the national committee. Committee members accepting appointment by Miss Butler were: Mary K. Walsh, The Washington Water Power Co.; Neil Laws, Puget Sound Power & Light Co.; Gertrude McDevitt, Idaho Power Co.; Charlotte Cummings, Utah Power & Light Co.

This was a smaller committee than usual, but it was the belief of Miss Butler that more could be accomplished by this small group in the way of outlining a plan of activity, than by a larger and less flexible number. Incidentally, it was her hope that a committee meeting more probably might be arranged with a limited membership than with the larger number.

Lack of a definite project and uncertainty regarding affairs of N. E. L. A. were contributing factors to the inactivity of this committee during the year. It was reported by Miss Butler, however, that many of the larger companies which she had contacted were keeping alive the women's activities in the form of luncheon meetings, dinners, public speaking classes, cooking schools and monthly discussion groups.

Engineering Section*

GENERAL ACTIVITY REPORT

ACTIVITIES of the Engineering Section have been confined to questions of economy in construction and operation. Current theft and methods of prevention, which is a timely topic, was discussed and the experiences of nine member companies were presented. A study of high-voltage fuses indicated that they may be substituted for circuit breakers in many cases under present conditions. A source of revenue was indicated in the use of electric boilers to take the place of fuel-fired boilers for central steam heating service. Accident experience of member companies was presented. These data provide an index for member company safety activities. It was also pointed out that a small amount of attention paid to automobile hazards insured considerable savings in operating costs. The subject of maintenance and operation of transmission lines under present conditions was presented. It was pointed out that a study of organization, records and reports, closer inspection of property, and more exact determination of need of maintenance to determine whether it was essential, showed the most fertile fields for economy. Another paper showed that the common method of indicating increase or decrease of system energy output over the previous year and the same month of the previous year was misleading. Many times an increase or decrease started or stopped many months prior to or after the indicated time. By developing what was named a "no-growth" curve, the actual trend of the system energy output could be determined. An economical method of locating a submarine cable by means of audio amplification was presented as the result of an experience with a cable across the Columbia River.

GENERAL MEETING

The Tenth Annual general meeting of the Section was held at Portland, April 20-22, 1933, at the Heathman Hotel. A registered attendance of 135 was very gratifying. All sessions were well attended and a number of separate committee meetings were held at luncheon and dinner. Details of the program were published in EWEST, April, 1933, p. 171.

MISCELLANEOUS ACTIVITIES

An organization meeting of the executive committee was held at Seattle, Sept. 23-24, 1932. O. L. LeFever and E. H. Collins were delegates to the national group meeting at Chicago, October 3-7, 1932. A second meeting of the executive committee was held at Portland, April 20, 1933. At this meeting there was a full discussion of engineering association activities. As a result of this discussion it was recommended to the Northwest Electric Light and Power Association that the engineering work be continued, that we continue to hold group meetings, that the proceedings of these meetings be published and that activities be consolidated into four groups: (1) power generation; (2) transmission and distribution; (3)utilization; and (4) general. The discussion also emphasized the value of safety work. The executive committee recommended the appointment of officers for next year as follows: W. S. Hill, Grays Harbor Railway and Light Co., chairman; J. Hellenthal, Puget Sound Power and Light Co., vice-chairman.

It is appropriate at this time to express appreciation to each member of the engineering section from every other member for the fine cooperative spirit which made possible a very successful group meeting under such adverse conditions. Much appreciation is also due the officers and executive committee of the association for making possible the completion of this year's activities.

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*EXECUTIVE COMMITEE

Chairman, E. H. Collins

Vice-Chairman, W. S. Hill

Committee Chairmen	Members at Large
J. B. Fisken	
J. E. Yates	
J. Hellenthal	J. C. Boyle
O. L. LeFever	C. P. Osborne
P. P. Ashworth	C. P. Elliott
T. A. Purton	H. H. Cochrane
H. H. Schoolfield	O. D. Lanning
G. E. Quinan	

Sales Section*

Introductory Statement

By L. W. BRAINARD, chairman

THE work of the Sales Section of the Northwest Electric Light & Power Association was brought to a climax at the eighth annual section meeting at the Benson Hotel, Portland, March 30 to April 1, 1933. At this meeting, reports of thirteen committees and three bureaus were presented, covering all fields of sales development activity. A total attendance of 140 at the various sessions was very gratifying in the face of present conditions.

Practically all the reports, papers and discussions presented at this meeting are published in the following pages, with a few exceptions, to which I would like to refer.

The meeting was keynoted by J. E. E. Royer, The Washington Water Power Co., president of the Northwest Association, who, at the first session, referred to the importance of Sales Section activities and urged continued efforts toward securing the cooperation of dealers and all branches of the electrical industry in promoting the sale of converting devices. He also pointed to the tendency toward "ensemble selling," or the selling of a complete electric kitchen or electric laundry, rather than the selling of individual units.

ELECTRIC COOKERY COUNCIL

A. C. McMicken, Portland General Electric Co., represented the National Electric Cookery Council in the absence of M. L. Hibbard, Idaho Power Co., regional director. He told of the organization of the council in this territory. Among the first and largest of the local councils to be formed is that called the Electric Refrigeration & Cookery Council of Oregon, composed of distributors of electric ranges and refrigerators and utility companies in that state. This group hopes to cooperate in organizing cooking schools, demonstrations, shows, schools for salesmen and similar activities in different parts of the territory, working through the dealers of the member distributing companies.

The organization of the council in the Northwest consists of the following:

Divisional Director: M. L. Hibbard, Idaho Power Co.
Operating Sponsors:

Glenn L. Jackson, The California Oregon Power Co.
J. P. Lottridge, Eastern Oregon Light & Power Co.
H. G. Kelsey, Grays Harbor Railway & Light Co.
L. W. Brainard, Idaho Power Co.

*Executive Committee: L. W. Brainard, chairman; R. B. McElroy, vice-chairman; Glenn L. Jackson, K. M. Robinson, L. A. Lewis, S. B. Clark, H. S. Atwood, R. M. Bleak, D. B. Leonard.

J. B. Buman, Northwestern Electric Co.
Guy Davis, Pacific Power & Light Co.
A. C. McMicken, Portland General Electric Co.
P. R. Larsen, Southern Utah Power Co.
W. O. Cluff, Telluride Power Co.
R. M. Bleak, Utah Power & Light Co.
R. B. McElroy, The Washington Water Power Co.
C. A. Comstock, West Coast Power Co.

REFRIGERATION BUREAU

The refrigeration bureau, again functioning under George M. Gadsby, Utah Power & Light Co., regional director, and five state directors, was represented at the meeting by R. B. McElroy, The Washington Water Power Co., director for Washington. Mr. McElroy told of headway made during the past year in the formation of local bureaus and called attention to the value of this cooperative work in increasing the sale of refrigerators and in promoting generally healthy relations among dealers in this device.

The personnel of the bureau organization is as follows:

Regional Director: George M. Gadsby, Utah Power & Light Co.
State Directors:

Idaho: L. W. Brainard, Idaho Power Co.
Montana: J. C. Ryan, Montana Power Co.
Oregon: Glenn L. Jackson, The California Oregon Power Co.
Utah: H. M. Ferguson, Utah Power & Light Co.
Washington: R. B. McElroy, The Washington Water Power Co.

A talk by George C. Tenney, editor of ELECTRICAL WEST, brought out the necessity for aggressive action along defensive lines to hold present business and regain lost load. He told of tactics employed by companies outside the Northwest territory.

Diversion was offered at two of the sessions by talking pictures, two furnished by Frigidaire Corp. on selling air conditioning, and one by the General Electric Co. of a general inspirational character. I would like to take this means of thanking these companies for thus contributing to the program of the meeting.

I need not refer specifically to the other reports and discussions presented at the meeting, since they all appear in the following pages. I do, however, commend them to the attention of all in the sales development departments of our business, as they contain much valuable information and many helpful suggestions. I want to thank most heartily all the bureau and committee chairmen and their committeemen for the excellent work I feel they have done in preparing these reports. I also desire to thank those representatives of manufacturing and distributing companies who contributed many informative discussions to the programs of several of the committees.

GENERAL COMMITTEES

Utility Advertising

A UTILITY sales development program resembles, to a great extent, the game of war. While the enemy in war is composed of men and materials, we are at war with an equally tangible and stubborn enemy called "Sales Resistance." As in actual war, our advance requires careful planning and organization of men and materials, if the enemy is to be overcome and the objective reached. In our own game of war, advertising plays a vital part, without which our advance would be materially hampered, if not impossible, on the scale necessary if revenue and investment are to remain in their proper relationship. Advertising, to us, is the same as ordnance to the army.

*Report of the advertising committee, Sales Section, Glenn L. Jackson, The California Oregon Power Co., chairman.
Idaho Power Co.: L. W. Brainard.
Pacific Power & Light Co.: Will T. Neill.
Puget Sound Power & Light Co.: R. W. Clark.
Utah Power & Light Co.: R. M. Bleak.

In war, the problem is to reach an objective with the lowest possible cost in men and materials. In our business, the problem is to build additional load in the most economical and rapid manner, at the same time encouraging, organizing and coordinating the efforts of all who would become our allies.

With the original presentation of this report was a pictorial chart representing men and materials of war aligned in a coordinated drive on an enemy position designated "Sales Resistance." The analogy between the situation in the picture and the allocation of an advertising budget to be coordinated with the sales organization of a utility and the electrical dealers was plain. The ordnance shown in the picture was compared with the various media of advertising at the disposal of the utility company, the manufacturers and dealers. The troops represented salesmen.

INFORMATIONAL ADVERTISING

Heavy artillery, piercing the outer shell of the defense, and the lighter field guns, a trifle more accurate and trained

upon more definite objects, made up a blanket barrage on the heavier defenses and were compared with informational advertising. This advertising is designed to create appreciation for electric service, dispelling the theory of high cost, and to sell the public on the adaptability and convenience of electricity for a multitude of services.

One of the greatest elements of resistance to a greater use of electricity at the present time is the impression that electricity is high in cost. The customer still is thinking in terms of fifteen years ago, when the electric statement represented largely the cost of lighting. The monthly service bill still is referred to as the "light bill," with little appreciation of the many services it performs in the home or the low unit cost of that service. Rates generally are understood by the customer as the amount per kilowatt-hour indicated in the first block of the rate schedule. The customer's impression of all electrical appliances or of electrical service is rooted in lack of understanding and misconception of operating costs. Before appliances or apparatus of any type can be sold in quantity at low sales cost, this misconception must be corrected.

Some utilities have instituted informative advertising campaigns, based on the services one cent's worth of electricity will perform. Others have attempted to point out that the monthly service bill is no longer a light bill—analyzing these service bills and impressing the customer with the many services electricity performed during the month. Again, since the use of electricity still is comparatively new, its convenience, safety and adaptability must continue to be sold.

There are several media through which informative advertising may be used in tearing down this outer armor of sales resistance: newspapers, billboards, displays, demonstrations, imprinting backs of electric statements, customer education through employees, et cetera. In the more specialized fields such as the farm, the store, the office and the factory, trade publications, farm magazines and direct-by-mail are the most effective, because the type of educational advertising must be selective in nature, dealing with the needs of a specialized group. Since, to these customers, the use of electricity is associated more closely with the business of making a living, information must be technical and specialized in nature, dealing largely with improved processes or applications made possible by the use of electrical service. The field has more definite limitations than the larger residential group and should be given extra consideration if manufacturers and dealers are to promote the sale of converting devices at a profit.

SELECTIVE ADVERTISING

Referring again to the battle chart, machine guns, howitzers, trench mortars, tanks, bombs, et cetera, all of which are more selective than the heavy guns in the rear, were compared with the media used in the promotion of definite appliances, fixtures, machinery and other converting devices. In this alignment of force the utilities have valuable allies, the dealer and the manufacturer, who play very important parts. On the chart, machine guns represented dealer and utility appliance newspaper advertising; manufacturer's advertisements in national publications, trade journals and technical magazines were designated as howitzers and trench mortars; direct-by-mail appliance advertising, as bombs dropped by planes; tanks represented cooking schools, shows and demonstrations; and gas clouds, hanging over the defense position, indicated radio advertising.

The above are effective and definite close range interest-getters, each performing a definite function in eliminating sale resistance, under cover of what the salesmen as shock troops may advance without delay, armed with the hand-grenade of specialty selling—namely, home demonstration—and the rifle and bayonet of knowledge and aggressive salesmanship, with the greatest certainty of success and the lowest cost per sale.

ADVERTISING BUDGET

We have set up an advertising budget for a utility having a gross revenue of $4,000,000, indicating the amounts and percentages to be spent for various types of advertising through the media represented. While the media may vary, due to local conditions, we believe that their use, and the segregation of advertising types as shown, is essential to the conduct of an effective promotional program.

For a utility having a gross revenue of $4,000,000 annually, we suggest an advertising budget of ¾ of 1 per cent, or $30,000. This should be apportioned somewhat as follows:

	Per Cent	Amount
Residential Service Advertising		
Newspapers	23	
Poster boards	5	
Displays	2	
Miscellaneous	4	
	34	$10,200
Rural, Commercial, Industrial Advertising		
Farm magazines	6	
Direct-by-mail	10	
	16	4,800
Merchandise Advertising		
Newspapers	26	
Radio	8	
Display	2	
Direct-by-mail	10	
	46	13,800
Cooking Schools, Shows, Demonstrations	4	1,200
Total	100	$30,000

ADVERTISING IDEA NEEDED

The quality of advertising ammunition is of the utmost importance. Hit and miss, unrelated advertising, even though used in quantity through all media, is expensive and ineffective. We need an advertising idea. That idea must have definite customer appeal and should be carried as a key through all types of advertising. It may be the all-electric home, the electric kitchen, or what one cent will do in the operation of various appliances. (See samples reproduced.) Whatever it is, an idea is essential to good advertising. Too long have we stressed special offers, prices and terms. Such advertising is predicated on the thought that the public already is sold on electric service and the converting devices necessary for its use and are interested only in bargains and that the fellow who has the greatest bargain, whether it be furniture, automobiles, washing machines or what-not, will get the business. Price of the appliance is the last step in our selling process. The problem is to create desire. The greater the desire created, the less important price becomes.

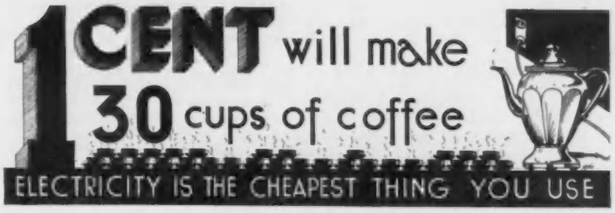
A great many of our current trade problems may be traced directly to past merchandise advertising practices. The apparent theory that the public has been interested only in washing its clothes in a dollar-down washing machine, cooking meals on a $2-a-week range, and keeping the baby's food in a 24-months-to-pay refrigerator, has bred turmoil in the ranks of the electrical industry. While it is true that price, down-payment and terms have a place in the selling picture, it is by all odds secondary to the importance of selling the electrical idea. Such advertising, in addition to creating trade difficulties, contributes nothing toward the development of an electrical consciousness. We must bear in mind that the service received is our paramount appeal and is remembered or enjoyed long after the price has been forgotten.

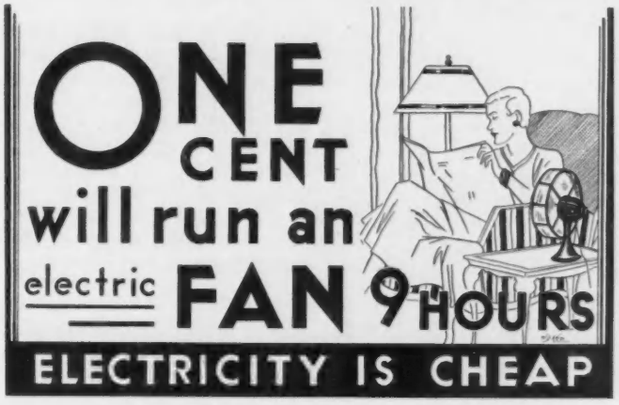
DEALER COOPERATIVE ADVERTISING

In the past few months, the pendulum of utility merchandise advertising has apparently swung in the opposite direction and now is regarded generally as dealer cooperative merchandise advertising. Prices, terms and down payment have been eliminated to a large extent and the copy has become more general in nature.

So-called "dealer cooperative advertising" in many instances has been a waste of time and money, detracting from the sales punch of the utility "ad" and, at the same time, doing the dealer absolutely no good. Why advertise a Whoozit De Luxe electric range, dwelling on its exclusive features, et cetera, with the signature on the bottom of the advertisement "Podunk Power Company or Your Dealer," when you know and the dealer knows that that particular line of electric ranges is sold by the power company only and can be purchased nowhere else in the community?

That, unfortunately, has not been the worst offense against good advertising practice. The punch of so-called "dealer cooperative advertising" has been pulled in an effort not to





Advertisements showing what one cent will buy

appear too aggressive and to give the dealer a break, resulting in no return from the "ad," needless expense, and no benefit to either the dealer or the utility. Again, we find a certain amount of advertising designed as appliance-selling advertising, which includes reference to a number of trade lines with a list of the dealers handling the appliance. At best, only one or two selling points can be put over in a fair-sized advertisement. These points must not only be put over, but must be clinched, and the injection of any factor in the "ad" which raises doubt or confusion neutralizes the value of the "ad."

Your committee believes that the value of cooperative dealer advertising lies entirely in the promotional field and is not to be confused with strictly merchandise copy. The cooperative background must be built with educational cost data and promotional advertising, dealing with the service itself, through newspapers, billboards, displays, demonstrations, imprinted electric statements, customer education through employees, et cetera. With the public appreciation of electric service and the function devices perform, as a background, the dealer then can advertise definite products with a maximum possibility of justifiable returns. If the retailing of electrical apparatus of any type is to become profitable and satisfactory to the dealer, public acceptance must be created. The public will accept merchandise advertising when it becomes sold on the idea that electricity is cheap, convenient, safe and that the service is easier to use and will perform the job more satisfactorily than any other method that could be employed, resulting in a saving of money, time, or adding to the safety, convenience and happiness of living. Then, and then only, will appliance advertising either by the dealer or the utility reach its full effectiveness.

COORDINATED PROGRAM DESIRABLE

We have examined samples of advertising used by utilities in the Northwest. Some are based on a selling idea, some are not. A few utilities provide an educational cost data and informational background for dealer and utility appliance advertising; others rely on appliance advertising alone. It is apparent that no utility in the Northwest at present is taking advantage of all the possibilities of a full-coverage, coordinated advertising program, nor do we believe that appliance advertising has reached or will reach its full effectiveness until there is a greater coordination between the utility, dealer and manufacturer, stressing a real selling idea. There is evidence of a definite need for specialized, promotional advertising on commercial lighting, commercial heating, industrial applications and rural electrification, which can be merchandised successfully by the dealer and manufacturer. We are convinced that the possibilities of utility advertising barely have been scratched.

In the early past of 1932, the residence sales committee of the N. E. L. A. presented the complete electric home idea with the slogan, "That She May Have More Leisure." Several manufacturers since that date have adopted and are sponsoring the all-electric kitchen idea. In taking a leaf from the experiences of the National Electric Refrigeration Bureau, we believe that coordinated manufacture, dealer and utility advertising is possible. A definite forward step could be made in the adoption of the all-electric home as the key idea around which could be build all utility, manufacturer and dealer copy, the educational background necessary for the acceptance of the electrical home idea to be put over to the customer through utility informative advertising. Individual items making up the electrical home can be advertised through this key by all manufacturers and retailers. All types of demonstration, display, shows, et cetera, can be tied in easily with such a key idea, resulting in a unified sales promotional advance by the utility and its allies against our common objective, "Sales Resistance."

In conclusion, your committee recommends a study by the manufacturers and utilities with the idea in view of adopting a key selling idea, to be used by all branches of the industry. This committee further recommends a study of dealer cooperative advertising and the unification of dealer cooperative advertising methods. We believe that such a plan will correct a great many of our trade problems, reduce advertising costs by the elimination of waste copy, make possible the more profitable distribution and sale of converting devices and insure the maximum results in increased load to the utility company.

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*Cooperation With Dealers**

A DEALER relations committee was organized last October by selecting a member from each state of the Association territory whose company responsibility extended beyond that of merchandising.

About that time we received a report that John Ott, president of the Pacific Northwest Hardware & Implement Dealers Assn., at a meeting of the national committee in Bangdon, Ind., presented a resolution condemning the public utilities and their merchandising activities.

Your chairman immediately contacted Mr. Ott, who was a dealer in the territory of The Washington Water Power Co., and found that his action was due entirely to misunder-

*Report of the dealer relations committee. Sales Section, Lewis A. Lewis, The Washington Water Power Co., chairman.
Idaho Power Co.: K. M. Robinson.
Montana Power Co.: J. C. Ryan.
Pacific Power & Light Co.: W. T. Neill.
Portland General Electric Co.: A. C. McMicken.
Puget Sound Power & Light Co.: S. P. MacFadden.
Utah Power & Light Co.: H. M. Ferguson.

standings brought about principally by anti-merchandising articles in some of the Eastern magazines and erroneous statements made from hearsay by dealers in his own organization. After learning of the position of the utilities toward merchandising in this territory, Mr. Ott appointed a utility merchandising committee to study the utilities' activities and to report at the annual meeting to be held in February, 1933, and suggesting that our committee meet with theirs previous to this meeting.

Subsequently your chairman arranged with individual members and officers of the Hardware & Implement Dealers Assn. for a general meeting in Yakima, Nov. 27, 1932, at which all members of the Washington dealer relations committee were in attendance, with most members of the Hardware Assn., including E. E. Lucas, secretary.

As a result of this meeting, your chairman was invited to address the annual meeting of the Hardware Assn. in Spokane on Feb. 2, 1933, at which time the utility committee of that association reported. Following the report, the association approved the policies laid down by the utilities of Washington and northern Idaho and passed a resolution commending the utility contact committee for its good work, accepting its report, expressing appreciation of the cooperation of your chairman and other utility men and companies in the Pacific Northwest, and urging dealers to cooperate with local managers in carrying out the cooperative policies decided upon.

Although we do not have a detailed report of committee contacts made in other states, the official organ of the hardware associations, "The New West Trade," reported on the Idaho meeting, quoting the chairman of the Idaho utility contact committee as follows:

"The committee appointed by the association was at first inclined to urge legislation against the power companies. After meeting with the utilities, we decided to withdraw legislation and work on a cooperative basis. I have not received a single complaint in 1932 as a member of the committee, although I know there are some hardware retailers who insist the power companies are not doing as they should. The utilities are 100 per cent for cooperating on any plan that seems feasible. In some sections the utilities have gone out of the merchandising business because of the fine work of the retailers."

L. W. Brainard, sales manager for Idaho Power Co., addressed the meeting on dealer relations, and it is evident that there is a good understanding in that state.

The meeting of the Oregon Section of the Retail Hardware & Implement Dealers Assn., was not as successful and a resolution was sent to the state legislature, then in session. Impending anti-merchandising legislation, however, was defeated, due to the activity of the electrical fraternity, who cooperated effectively in presenting facts to the Senate industries committee, which saw its way clear to kill the legislation.

Nearly all of the utilities are taking a broad attitude in their merchandising policies, and nearly every utility in the Northwest has accepted the Statement of Merchandising Procedure of the Joint Electrical Merchandising Committee, which is as follows:

STATEMENT OF MERCHANDISING PROCEDURE
JOINT ELECTRICAL MERCHANDISING COMMITTEE

It Is Recommended That Electric Utility Companies Take the Initiative in Bringing About Conferences With Dealers in Their Localities to the End That the Following or Other Mutually Acceptable Procedure Be Recognized, Adopted and Put Into Use for the Purpose of Stimulating the Sale of Suitable Electric Appliances and Promoting the use of Electric Service in a Way That Will Be Mutually Advantageous to the Consuming Public, the Utility, the Appliance Manufacturer and All Merchandising Outlets.

1. The distribution of electric appliances should be on the basis of fair and open competition in the interest of the consuming public, the utility, the appliance manufacturer and all merchandising outlets.

2. All electric appliances offered for sale by cooperating agencies should be standard appliances.

3. No appliance or merchandise not directly related to the use of electricity should be sold by electric utilities.

4. In all merchandising activities the retail price of all electric appliances that have received reasonable customer acceptance should be consistent with present-day merchandising practices.

5. There should be no premiums given nor unreasonable trade-in allowances made in connection with the sale of any such appliance.

6. The presenting to the public of those electric appliances not having received reasonable customer acceptance should be considered as promotional activities and not as merchandising activities.

7. Coordinated advertising of approved appliances should be developed by electric utility companies and local dealers, and the electric company should give all reasonable assistance to the dealer in advertising, displays, and sales assistance.

8. The deferred payment feature of merchandising activities should be on an economically-sound basis.

9. There should be a segregation of the accounting of the merchandising departments of power companies from their public utility functions, and all items of expense incurred in the merchandising of appliances should be charged to the merchandising activities.

Many utilities have gone considerably further in their cooperative efforts than is outlined by this procedure and are contacting their dealers regularly and keeping them advised of their policies. It was surprising to your chairman in contacting dealers and dealer groups to find that they knew so little about the merchandising policies of the utilities operating in their field. This leads your committee to urge that every major company should maintain contact men, somewhat isolated from their merchandising department, to contact regularly all of the dealers in their territory.

The Idaho Power Co. in 1932 placed itself on record by printing its Merchandising Policy and Employee's Code of Ethics, which did nothing more than to place in print what the company actually had been doing for some time. These policies have been adopted by other of the Northwest companies, and from the experience of your chairman, have done more to clear up the misunderstanding that existed between dealers and utilities than anything that has been done in the past few years.

It is true also that the formation of local refrigeration bureaus and cookery councils has been a major factor in bringing about improved relations. It is my closing suggestion that every utility have a very definite merchandising policy, that this be published and distributed to every dealer in its territory, that it be thoroughly explained, and that the intent of the policy be lived up to by the merchandise department. More frequent contacts should be made with dealers, not only by merchandising men, but by the executives of the company, whose responsibilities reach further than merely to put current-consuming devices on the lines.

* * * * *

(Note—To get various viewpoints of problems involving merchandising and the distribution of appliances to the public, the committee asked E. E. Lucas, secretary of the Pacific Northwest Hardware & Implement Dealers Assn., to present the viewpoint of the hardware dealer, and George A. Boring, Portland manager for General Electric Supply Corp., to discuss the subject from the standpoint of the manufacturer and wholesaler. Mr. Boring brought out that changing conditions in the retailing field had brought many changes in policies of manufacturer and jobber. Extracts from Mr. Lucas' address follow:)

Viewpoint of the Hardware Dealer

By E. E. Lucas

Utility merchandising, which has developed competitive conditions concerning which other merchants have justly complained, has been a matter of evolution.

It has been claimed by the utilities that in the beginning, and subsequently in the development of new lines, other merchants showed little interest in taking on and pushing items without established demand, and that the power companies were forced into selling.

Doubtless there was some merit in this contention, since it is easily understood that in those early days the hardware merchant could hardly be expected to be greatly concerned with pushing the sale of a new item, such as a gas range, for instance, as against wood and coal ranges then in popular demand. But such a situation does not prevail today, when merchants of many types are anxious to enter the appliance field, if they can sell the goods at a profit.

When the electric utilities began seeking new outlets for current consumption, they turned to domestic uses. Irons, washing machines and other appliances were electrified. The electric companies did much excellent work in securing consumer acceptance and other dealers, sensing a new market, added such items to their regular stocks. Up to this point

there was not general complaint of the competition, nor were the methods used by the utility companies subject to criticism to the extent that later developed.

Then utilities were largely individual properties; merchandising efforts were not thoroughly organized nor especially aggressive. Then came the formation of holding companies, the bringing together of a number of companies under one ownership or control, the practical establishment of chain-store merchandising in the electric field.

This created an opportunity which the appliance manufacturer quickly sensed and capitalized. Instead of sending his salesmen from town to town, selling individual utility companies, he was able to deal in one place with the management of a chain of utility stores. Now he could make special concessions, based upon large orders, and could lay out aggressive sales campaigns which would be followed through from a central source. The merchandising manager came into existence, and quickly multiplied with employment of additional merchandising managers in charge of subdivisions, or even local business of the utilities.

FORCES OF COMPETITION

Two forces converged to create intense competition for other types of dealers. First, the utility was anxious to increase the use of its product. Herein lay possibilities of large increased profits. Plants were not producing anywhere near capacity. Rates were fixed for a profitable return on the amount of product being consumed. Obviously, each appliance added made a permanent customer at a nice profit. Second, large orders, assured credit risk, appealed to manufacturers. Though perfectly willing to accept business from other outlets, the leaders would undoubtedly have been satisfied to have all appliances distributed through utilities.

The merchandising manager became a tremendous power. The question was not how much his department had lost, but how many new appliances had been placed on the lines. All of this the manufacturer encouraged. His prime thought was of his own sales. Whether his customers made money from sales of his product was inconsequential.

House-to-house solicitation developed. Crews made intensive sales campaigns. Tremendous quantities of newspaper space were purchased—out of all proportion to profit possibilities of the line. This advertising accomplished the double purpose of increasing the use of appliances, and of making the utility a valued customer of the newspaper.

So obsessed did the utility companies become with the selling mania that they first ignored the rights of other merchants and then resented their efforts to sell appliances. Diversion of sales to other channels threatened the power and prestige of the merchandising manager. He began to meet such attempts, aided by friendly manufacturers, with more aggressive sales methods, with smaller installment payments, with extra concessions to prospects who would purchase from the utility instead of some other source. His salesmen, employed on a commission basis, went to almost any length as to either terms or misrepresentation in order to close a sale.

In the spring of 1927, the merchandising division of the N.E.L.A. held a meeting in Chicago, and representatives of the National Retail Hardware Assn. were invited to sit in one of the sessions. Two members accepted. Before the meeting was adjourned, many of the utility gentlemen seemed to get a better understanding of the situation, and some even went so far as to admit that from the merchant's standpoint the situation might not be exactly satisfactory.

This conference led to subsequent meetings with utility groups, at most of which the National Association's president or some other member of the board, was present. At the second meeting, representatives of the National Retail Furniture Assn. were invited in, at our suggestion; and at later meetings, hardware wholesalers, department store people, retail druggists, electrical contractors and others became parties.

From the genesis of these conferences, it was most apparent that the utilities wanted to suppress, so far as possible, all critical publicity of their methods. Eventually, however, there came a partial meeting of minds involving the separation of appliance merchandising from regular utility functions, and official promises of reform of the major evils.

MERCHANDISING PRINCIPLES

A statement of merchandising principles was drafted, generally covering the points at issue, and subsequently adopted by the N.E.L.A. for issuance to its members, together with a supplemental statement specifically directed to the improvement of merchandising methods. The brief statement was not wholly satisfactory to anyone; compromises seldom are. But compromises are often necessary, and these "principles" served as a start.

Later, the preamble to this statement was misinterpreted, with apparent deliberation by certain interests radically opposed to utility merchandising, and an attempt was made to capitalize an erroneous conclusion by its complete isolation from all other parts of the "principles." In some cases the utilities also used parts of this statement in ways that were never intended, in an effort to strengthen their own position.

OBJECTIONABLE PRACTICES

The price-cutting of standard merchandise, either directly or through combinations, such as a washer and ironer for about the price of one, and the giving of premiums to induce purchases, showed little change. There was no apparent abatement in the ridiculous trade-in allowances for old appliances, which reflects price-cutting in another form. So-called easy payments were made still easier, if anything. There was no evidence of any effort to get larger initial payments or to shorten the length of the obligation. Four-dollar and five-dollar items continued to be offered at 25c. or 50c. down, or perhaps nothing, with ten or twelve months for the balance.

Charges for merchandise remained on the service bills, notwithstanding the easily-drawn inference that payment of the installment amount as well as the service charge was necessary to avoid discontinuance of service. Reports of excessive charges for service line installations, when appliances were sold by others, but with free extensions for purchases from power companies, were about as frequent as before. The condemnation and belittling of competitive merchandise by commission salesmen showed little or no change, the desire for the commission leading the salesman to all sorts of extreme statements and innuendos. In many cases, at the apparent behest of the employers, meter readers and other employees contacting consumers, constantly urged the purchase of appliances from power companies only, and insinuated lack of merit in the goods sold by others.

All these were factors of keen contention, and agitation respecting utility merchandising continued to grow. Hardware dealers and other merchants believed they had a logical place in appliance merchandising, and that utilities should be required either to discontinue merchandising or to operate on a basis with which other dealers could compete. Certain organizations were formed to promote legislation against the utilities, to which some hardware dealers subscribed and in which a few had been active. The proponents of such organizations claimed to see no possible solution of appliance selling except through legislation prohibiting utilities from engaging therein. Others believe that more can be accomplished through conference and understanding than through combat and misunderstanding.

NEW CONFERENCE PERSONNEL

In June, 1931, a new type of conference was held with the electric utilities. The utility personnel consisted of high officials of the principal holding companies, in contrast with the merchandising men who had attended previous meetings. It developed that many of these company heads were uninformed concerning the merchandising practices which long had been in existence with some of their subsidiaries. It was admitted by some that they had found within their own companies practices which they personally had long condemned.

Most of these gentlemen said they were just as strongly

in favor of sound merchandising as any of the merchants represented. Most of them insisted that their companies would give up merchandising if the job were effectively done by others. They were interested in kilowatt-hours, they said, rather than the sale of merchandise as such. There was general insistence also that the merchandising divisions were generally segregated from other operations and required to pay their own way. In the light of our presentation, most of the utility men said they did not blame hardware and other merchants for their criticism, and promised that they would take immediate steps for the elimination of the practices objected to.

It was at this meeting that the representatives of the electric utility companies agreed upon recommendations which were later adopted by the N.E.L.A. and promulgated to the entire industry. These merchandising principles are now well known.

RESPONSIBILITY WITH UTILITIES

These recommendations definitely place upon the operating heads of the power companies the obligation of "bringing about conferences with dealers in their localities" for the purpose of better understanding and the determination of merchandising policies mutually agreeable. The utility heads recognized that the initiative should be taken by the power companies, since all appliance selling, by whatever interest, is to their advantage. Assurance was given that the whole force of the N.E.L.A. would be put behind these recommendations to get action by local companies.

Complaint has been raised by some, utility representatives as well as dealers, that these recommendations are too general in their terms, that they mean little. It should be recognized, however, that since they were in the nature of general instructions to operating companies, intended to bring about local understandings and agreements, it had to be left to these local groups to determine policies and action best fitting their particular areas. Under these recommendations from the utility heads, many of the operating companies, during the past year, have made efforts to get closer to local dealers and to reach understandings mutually satisfactory.

Reports indicate that some have succeeded fairly well in developing coordinated effort by the dealers and themselves. In some cases it is said dealers have held aloof, apparently feeling that the utility had some ulterior motive, and fearing that something might be put over on them. In some sections power companies now are working harmoniously with dealers, where previously discord and disagreement was the rule. The change of merchandise managers, has sometimes been necessary to bring about the new condition.

In certain instances, local managers have gone rather far afield in attempting to work out cooperative plans, without the help of dealers and without full understanding of dealer problems and reactions. From the dealer standpoint, some of these so-called cooperative plans have not been satisfactory and, because the utilities have acted alone, dealers still are suspicious.

Many of the companies have drafted rules and regulations for the sale of appliances which eliminate nearly all the things complained of. A few companies have so changed their selling policies that the salesman helps other dealers as well as the company, and gets a commission from the company on dealer as well as company sales.

Most of the companies with which the National Association has been in contact have indicated a desire to be informed of transactions objectionable to dealers, and when complaints have been passed on have taken prompt action toward correction. Dealer reports from most areas indicate that conditions are much more satisfactory than formerly, and fewer complaints now reach association offices.

SEGREGATION OF OPERATIONS ESSENTIAL

The more one studies the problem of appliance selling the stronger becomes the conviction that there must be complete segregation of merchandising operations from regular utility functions. This means that appliance selling should be well removed from major operations of the utilities; that there should be no financial assistance from or absorption of losses by the utility. Merchandising divisions should have no allowances or other favors, such as electric current or the making of service connections, not offered on the same basis to others engaged in appliance selling. Merchandise billings should be entirely independent of billings for service. General promotional advertising should be in the interest of other distributors as well as merchandising divisions. Utilities, like other lines of business, should get on a sound foundation and plan their basic programs with full understanding of all the factors involved.

ELECTRICAL JOINT MERCHANDISING COMMITTEE

About two years ago the Electrical Joint Merchandising Committee was organized as a sort of evolution of the former less formal conferences of the several groups. This committee is financed jointly by the N.E.L.A. and the National Retail Dry Goods Assn., and the office of the committee is with the latter organization. The National Retail Hardware Assn. and the National Retail Furniture Assn. have had tentative membership on this committee, but have felt that their representation is somewhat limited because they have assumed no financial obligation. Much of the early work of the committee was in attempting to gather information about existing conditions which, it seemed to us, all the parties thereto already knew.

More recently, under a new manager, some so-called surveys have been made, one of which had to do with direct sales by manufacturers, and permitting the inference that hardware retailers are accountable for only 0.9 per cent of appliance sales. This report doubtless meant well, but it certainly missed focus in the fact that the average reader did not interpret the charts and figures as representing sales by manufacturers only. These figures were quite widely quoted, but always on the theory that each type of distribution represented a certain percentage of sales to consumers. Such a report was protested by ours and other interested organizations and effort was made to correct the wrongful impression that went abroad; but, of course, an error usually is much more far-reaching than its correction. The inference drawn from these figures is particularly unfortunate in the light of a recent survey by a utility company controlling a number of operating plants in one of the central states, which shows that hardware stores provide much the largest number of outlets for appliances.

PROMOTIONAL WORK

The problem of promotional work arises in any study of appliance selling. Utilities insist that dealers cannot be expected to put the same effort behind a new item that has not yet received full consumer acceptance that they can with one in ready demand. Dealers admit this, but say that it is exceedingly difficult, if not impossible, to determine the demarcation line between the promotional state and the demand period, and that utilities are prone to extend the promotional work much longer than is necessary.

The electric range gives evidence of the difficulty in connection with this promotional angle. Except in a few areas, where its use is generally established, retailers have not largely taken it on. Many dealers express the belief that it will never be a big item with them. The president of the Electric League in Cleveland, where the utility company does not merchandise, makes the frank statement that, in his opinion, the electric range will never be used widely there because of the high quality and low cost of gas in that area.

The study of appliance selling in all its various phases impresses one with its complexities. However, there are certain fundamentals that seem entirely clear, and on which most hardware men should be able to agree. Monopolistic operation of public utility service has long been accepted as in the public interest, but the legislative permission to fix rates providing a fair return on the invested capital does not contemplate the inclusion of every related activity into which the power companies may see fit to engage.

With legislative protection from competition in their own major fields, the building of a collateral competitive structure which wholly ignores the interests of others evidences the extreme of inconsistency; and it would seem that the sooner utilities recognize the limitations of their monopolistic rights and adjust their operations accordingly, the better it will be for the industry.

Wiring†

FOR its initial study, the wiring committee offered five subjects, namely:

1. The value of adequate residential wiring in terms of added revenue for the utility. (Covering both city and rural residential wiring.)
2. Successful plans and operation for promoting residential wiring adequacy in new and remodeled installations. (Covering conditions in both cities and rural territories.)
3. Discussion of new wiring methods and materials and their relation to installation costs.
4. The illuminating salesman's relationship with the architect and the speculative building contractor.
5. Methods of preventing current theft. (Suggested methods, such as metering ahead of main line switches or cabinets in cities, and pole metering for rural services.)

Nos. 3 and 5 were chosen by the committee for presentation at the annual Sales Section meeting held in Portland March 30-April 1, 1933, and are presented as follows:

New Wiring Methods and Materials and Their Relation to Installation Costs

By M. S. GLENN*

Wiring installations in new modern buildings and remodeling of wiring in old buildings has resolved into two classes; namely, economical installations and cheap installations.

ECONOMICAL WIRING

Economy in wiring does not mean economy of first cost. Even though the first cost is greater, the wiring may be economical in saving future additions and changes with attendant cost of breaking plaster and tearing up floors in order to add more outlets or to supply more capacity at distribution centers.

The modern building requires higher wiring capacities than ever before. To double or triple the wiring capacity in the initial installation does not mean the same proportionate increased cost as rewiring at some later date. Modern illumination standards and varied uses of electrical appliances have forced a higher standard of wiring, but the error of installing just enough capacity to carry the originally-contemplated load soon becomes evident when, on overlooking, excessive feeder and circuit losses are encountered together with lower lumen output of lamps.

INFERIOR WIRING

Inferior wiring is different from economical wiring for the reason that it is installed in the cheapest manner possible. In most cases inferior workmanship and materials are installed and in a very short time the installation becomes obsolete, calling for a greatly added expense to add any additional capacity or outlets. The initial electrical use is only a starting point, and to adhere strictly to the National or City Electrical Code minimum requirements is a mistake. Rigid specifications should be required to correct these faults and installations should be supervised by persons making specifications.

If fixtures and fittings are inferior and the wiring becomes obsolete, building owners constantly are faced with the problem of high maintenance costs and dissatisfied tenants.

NEW MATERIALS

The past year has developed numerous new materials and lighting fixtures. It is impossible to name all of them and discuss their merits, so only a few will be touched upon in this article.

Rigid Conduit—A new type conduit known as Steeltubes now is being manufactured, and many electrical contractors are using it wherever possible on account of the ease of installation. It is a circular metal raceway with inside diameter the same as iron conduit, but the outside diameter is considerably smaller. It may be used in most installations and is allowed by code in most localities.

Its weight is considerably less than conduit and the ease of handling is a big factor in its use. The total cost of tube and fittings totals about the same as the iron conduit, but the cost of installation is lower. Being of lighter weight, it requires special tools for bending, and all end fittings are of a slip-on type requiring no threading of the tube. A recent survey of electrical contractors shows that its use results in about 25 per cent savings in labor.

Flexible Conduit—For small buildings, residences, garages, factory maintenance and surface work, where low cost of installation is important, a flexible light-wall conduit is being manufactured. It bends readily to the touch, fishes in direct course through holes in beams from outlet to outlet, holds its true circular cross-section under any bend, and does not dent, crack or crush.

Wiring of new or rewiring of old residences can be well taken care of with this type of conduit if sufficient size is installed to allow for pulling in of an extra circuit or switch leg for future uses.

Metal Moulding—Metal moulding long has been in use as a circuit raceway carrying two, three or four wires. There now is being manufactured a two-wire, two-piece metal raceway in 5-ft. lengths. There is a box device fitting over the old box receptacle opening, adapting it so that metal raceway may run from existing outlets to where it is desired. There is also a duplex receptacle that may be used either lengthwise or endwise, and some small elbows to make bends. From the standpoint of cost, here is a real method of extending an already-existing circuit.

Wall Devices—Many manufacturers have introduced extremely low-priced merchandise in the wall device lines covering the staple or fast-moving items. This was a distinct lowering of the existing standards and many architects and builders who were delighted at the low figures of competitive bidders are just now learning that many of these items are only approved for low amperage, in some cases only one-third the former standards. Being cheaply built, they do not stand up.

A new interchangeable line now is being manufactured, with which it is possible for a distributor to extend the same service on a few hundred dollars investment that formerly took thousands, and the same is relatively true as to the contractor. It is necessary to consider this line as a whole, with its interchangeability and subsequent flexibility, and not as separate items. One method of expressing it is to say that from 23 basic units, 59,244 combinations can be made.

This astounding fact should intrigue the imagination of the electrical and general contractor as well as the architect, as it offers a wide field for selling greater adequacy and flexibility with each wiring job. The contractor located some distance from his jobbing supply can, with a hat full of this material, match all of the combinations previously occupying an extensive space on the jobber's shelves, and do it all within arm's reach.

With these 23 basic units, it is possible to make up easily and economically complicated combinations that occupy much less wall space than combinations previously available. Many examples can be worked out in three-device single gangs, which makes for more compact and neater appearing installations as well as materially cuts down the cost of the combinations. Moreover, should one of the devices in the combination be destroyed by abuse or other cause, it becomes necessary merely to remove that one from the assembly and replace it,

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†Report of the wiring committee, Sales Section, S. B. Clark, Northwestern Electric Co., chairman.
The California Oregon Power Co.: S. M. Bullis.
Idaho Power Co.: O. C. Mayer.
Northwestern Electric Co.: M. S. Glenn.
Puget Sound Power & Light Co.: H. A. Gardner.
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The Washington Water Power Co.: L. C. Aston.

*Northwest Electric Co., Portland, Oregon.

instead of throwing away the entire expensive combination as is necessary in the case of the older fixed assemblies.

All plates in the line are designed with knockouts for admitting the lock hood. Therefore, every switch in the line is a potential lock switch and can be converted at any time by the addition of the hood which costs the contractor 35 c. as compared to the more expensive piece of equipment formerly available.

A neat bell push has been given a place in the line. This permits working out a multitude of combinations, among which are servant call along with an outlet in the same single gang, door push and night light combinations, desk mats, light signals as well as all sound signal combinations.

A blank insert may be used to fill up an unused spot in a plate combination or cover a spot to be used later, and the center ring is a knockout for bringing out concealed cord combinations or running cord through to a rigid connection inside the switch box.

All of the units are interchangeable in the mounting straps. All of the plates have knockouts, making it unnecessary to seek a certain plate to make up a lock switch. Each combination mounting strap has a slot for mounting a box divider to be used between low and high voltage or between ground-antenna and 120 volt.

Some codes now being prepared require that switches in gangs located remotely from the circuits they control shall be indentified. The name plate in the line serves this purpose in a convenient and economical way and finds other useful applications.

It is possible to place in a sick room, nursery or bathroom a receptacle and a switch night light where there was only a receptacle before, and do it at small cost without additional wiring or boxes, and without tearing out plaster.

It is possible to place a switched pilot light and receptacle combination where the ironing usually is done and so tend to eliminate one of the large causes of fires; this can be done, as in the instance noted before, without much trouble or expense.

In either of these cases the switch can be made a lock switch without much additional cost to avoid the danger of children poking wires into the slots of hot outlets.

In schools and public buildings, the flexibility of the line is valuable since, when a combination is changed, the one taken out can be knocked down to units and used over and over again in vastly different combinations.

In estimating, cost finding is simplified for the contractor, as his combinations become the cost of the units added together.

RESIDENTIAL WIRING

Present methods of promoting residential wiring adequacy consist of contacting architects and owners by central station men, this being the best known method of getting adequate capacity and modern materials combined in plans and specifications. Through this method we have been able to increase the standard of residential wiring. To cite one specific instance in this city, the approximate revenue was increased from about $8 per month to $20 per month. The original wiring as layed out was estimated to cost about $300, but after contacting the owner and architect, and securing approval of a better job, the cost was increased to around $1,200.

We still are following along the old standards in the wiring or modernizing of old residences, but several manufacturers are about to produce new materials that will help us solve some of the problems we are confronted with in this field. Also, minimum standards will be increased in the 1933 code. In concluding, we might state that the tendency toward more flexible systems of wiring in new residences is rapidly gaining headway, and at the present time we are trying to promote the use of metal raceway as a residential wiring standard.

Methods of Preventing Current Theft Report of Committee

By GEORGE L. ELLERBECK*

Current theft, while not a new problem of the electric utility, is one of rapidly increasing importance. The apparent reasons for this increase are as follows:

1. In most cases very little effort has been made on the part of utilities to curb the theft.
2. The general prevailing feeling against the "great utility with the supposed guaranteed security of income" who fails to drastically reduce rates in proportion to the general decline of commodity prices.
3. Reduced incomes generally, and increased unemployment, reducing purchasing power of the average family.
4. The ease with which, under existing wiring ordinances, tampering can be done. A person successful in this theft will always tell his relatives and trusted friends how it can be done.

METHODS OF ACCOMPLISHING CURRENT THEFT

Following are the methods utilized by offenders in accomplishing this theft:

1. Approximately 45 per cent of the cases consist of a horseshoe jumper placed across one or more of the current coils. This jumper is placed in the main service entrance switch.
2. Approximately 45 per cent of the cases, either concealed or open wiring, is done to connect one side of the main line to one of the light sockets in the house.
3. In a very few cases, probably 5 per cent of the total, some form of brake is placed on the meter disk or the position of the magnets with respect to the disk is changed so as to slow up the operation of the meter.
4. At the present time we find that approximately 5 per cent of the cases, where there is no service on the premises, persons will actually connect to the services on the neighboring premises and use current from that source. This method has come into greater use of late, and becomes a difficult problem to handle.

EXTENT OF THEFT

Reports from the various properties indicate that in some cases as high as 4 per cent of the customers are receiving electric current for which they are not paying. It was the experience of one company, in placing check meters outside of the premises of the customers, that approximately four times the registered current consumption was actually used. Based on this figure, it was estimated that in 1932 the total number of kw.-hr. lost through stealing, where actual detection was made, was upwards of 160,000 in a community of some 45,000 customers. Probably at least that much more energy is being stolen, of which no check has been made. In Salt Lake City at the present time there are about 160 check meters in operation continuously. It is estimated that there are about 1,000 cases of stealing in Salt Lake City alone in which it has been impossible to prove the theft.

Below is a tabular summary of the cases of current theft which have been detected by one company from 1923 to the present time. It will be noted that the number of cases detected are increasing in much greater proportion than the amount of money that has been collected in each instance:

Year	Cases Detected	Total Money Collected	Average Bill
1923	37	$1,245.00	$33.65
1924	157	2,600.75	16.56
1925	193	1,681.10	8.71
1926	344	3,108.60	8.10
1927	314	3,323.10	10.58
1928	241	1,757.05	7.29
1929	167	1,265.06	7.19
1930	198	1,274.17	6.44
1931	318	1,444.11	4.54
1932	673	2,653.36	3.94

Following is a tabulation showing the experience of the Utah Power and Light Co. for the years 1931 and 1932, indi-

*Utah Power & Light Co. Paper prepared from information and data furnished by five member companies.

cating comparative findings in different-sized communities on that company's system:

Division	Total Customers	Cases Detected 1932	Cases Detected 1931	Reported By Employees 1932	Reported By Employees 1931	Reported By Others Not Reg. Employees 1932	Reported By Others Not Reg. Employees 1931	Amount Collected 1932	Amount Collected 1931
Bingham...	2,777	15	1	...	...	...	...	$ 9.92	$ 20.00
Ogden.....	16,327	117	87	49	62	...	1	742.31	534.30
Park City..	1,952	6	10	6	5	...	10	75.00	36.98
Preston....	7,531	17	11	16	7	17	11	73.89	10.00
Provo.....	10,533	46	21	46	20	...	....	294.28	216.31
Rexburg...	5,951	15	8	8	4	1	1	56.20	21.12
Salt Lake..	45,172	446	173	315	142	328	142	1,387.00	592.00
Wyoming..	1,479	2	3	1	...	1	1	8.26	1.50
W.C.P.Co..	5,636	9	4	...	...	9	...	6.50	11.00
Total.....	97,358	673	318	441	240	356	166	$2,653.36	$1,444.11

It will be noted in the tabulation the great increase in number of cases in the last year.

METHODS OF DETECTION

Following are the most successful methods of current theft detection as indicated by the several companies:

1. Periodic check of all meters.
2. Employment of special investigators.
3. Payment of bonuses to employees and sometimes to informants outside of the employ of the company. Bonuses of from $1 to $10 are paid by some companies for information leading to detection, furnished by employees.
4. Careful scrutiny of accounts. When any account seems to be out of line with an estimated probable consumption, a check meter is installed out on the service pole.

PRESENT METHODS OF PREVENTION

Following are some of the present methods utilized to prevent theft:

1. Reading every meter every month, whether account is active or not.
2. When meter is out of service, by shorting wires on house side of meter, causing a short circuit in case service is re-established.
3. By forcing customer who has been caught stealing to enclose all wiring on line side of meter in rigid conduit.
4. By placing meter outside on service pole, not accessible to customer.
5. By prosecution of persons caught stealing current.
6. By the installation of a meter guard covering meter wires.

It appears to this committee that none of the above methods are adequate, or will completely prevent all classes of current theft.

RECOMMENDATION

With the passage of new ordinances in some communities, it now is permitted that the meter be placed directly on the line, which makes possible the installation of the meter on an outside wall of the customer's premises. In this case, it is necessary, of course, for the company to provide some weatherproof housing for the meter and test facilities. However, we feel that the additional expense is thoroughly justified, due to the facility of reading and testing meters and the discouragement of current theft. This can be accomplished either by the use of an outdoor detachable meter or by the use of some weather protective equipment with an ordinary type of glass cover meter. In either case, test facilities readily can be incorporated in the installation.

It is the conviction of your committee that this is the only method which can be wholly satisfactory in preventing the continuation of theft of electric current in the case of metered installations.

Some utility companies, as applied to commercial customers, have electric service schedules permitting the use of flat rate service, including lamps, patrol service and general equipment maintenance. These schedules apply to advertising lighting such as store windows, floodlighting, sign lighting, billboard lighting and general outside lighting. Within a certain district, in each case designated by the company, it furnishes patrol service, turning on and off these installations at specified hours of the night. Outside of this district customers are asked to furnish an electric time switch which the company maintains and sets for the proper time. All have experienced some difficulty with this class of service. Some customers will make use of this type of lighting during day time hours, particularly as applied to store window lighting. This, of course, not only uses additional current for which they do not pay, but shortens the overall life of the lamps which the company furnishes.

Various means have been tried to prevent this excess use of flat rate facilities, with but little success. This committee believes that this problem can only be answered satisfactorily by insisting that every customer furnish a time switch which is sealed, with access only to the company representative.

There is some indication of the excessive use of flat rate facilities in the case of flat rate water heating service. This committee believes that the answer to this problem, is in using only rigid conduit or armored cable for wiring these facilities to prevent tampering, or the installation of some current limiting device which is sealed in a steel box, with access only to the utility company representative.

INDUSTRIAL AND COMMERCIAL SALES BUREAU†

*Commercial and Industrial Air Conditioning**

Report of Committee

WE HEAR and read much of air conditioning, in periodicals, in the newspapers, over the radio and in all trade journals. This industry is being presented to the public continuously, and there is no doubt that it is slowly gaining public acceptance. Every day brings new phases in our own electric industry that are basic and of far-reaching significance. The market and application of electricity to human wants is likewise in its infancy. We have grown rapidly in the last ten years in this application, and we are not marking time now.

Air conditioning is one step at hand in our development of applied electricity. The possibilities for load building depend only upon our vision. Let's consider, if we can, a billion homes dustless, with a clean, invigorating, healthful atmosphere 365 days of the year, no matter where located, on the equator or at the north pole, and let us visualize the market possibilities involved and the industrial expansion resulting from a full exploitation of this market.

The commercial and industrial air conditioning possibilities are equally as extensive and vast, but for our discussion here perhaps we had better get down to earth and see what is in sight for this year and how best we can develop public acceptance and go after some load now available in the broader aspect of conditioned air.

Fish live in a sea of water that is visible to our eyes. We can see it, feel it and sometimes smell it. We live in a sea of air that is invisible to our eyes. We cannot see it nor feel it, and when it is clean we cannot smell it. Only when we give it motion and heat are we conscious of it. This in-

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The California Oregon Power Co.: Geo. McClellan.
General Electric Co.: C. E. Canada.
Graybar Electric Co.: E. J. DesCamp.
Idaho Power Co.: O. C. Mayer.
Pacific Power & Light Co.: R. M. Freeman.
Portland General Electric Co.: F. H. Murhy.
Utah Power & Light Co.: J. F. McAllister.
Westinghouse Electric & Mfg. Co.: H. T. Whitehouse.

visible band of air surrounding our earth is only a few miles in thickness. As for water, we pump it, we clean it, we can heat it, we can take the air out of it or we can put air into it. Let's look at this air we breathe in the same way; we can pump it, we can clean it, we can heat it, and we can take the moisture out of it or add moisture to it.

We have laws governing the purity of the food we eat and the water we drink, but we find in this air we breathe an accumulation of dust, soot, old rubber, grit, animal secretion and filth that staggers our imagination. This accumulation in the air is causing an economic loss in industry each year that will likewise tax our imagination to comprehend. I take it, this is one reason for a committee on commercial and industrial air conditioning.

We can control any problem in indoor or process air conditioning. These problems are divided into four major factors:

1.	Temperature	heating cooling
2.	Humidity	humidification dehumidification
3.	Air cleaning	removal of harmful products recovery of valuable products
4.	Air motion	suction pressure

Actually, however, there is a fifth major division in our study of commercial and industrial aspects of air conditioning and its relation to load building. This fifth factor is air conditioning for comfort and would include the other four factors in so far as they pertain to human comfort. This fifth factor is perhaps what many of us think of when air conditioning is mentioned. The possibilities in this line alone are tremendous. The committee feels that this is one of our major problems, but not by any means the only one. We have taken the broader view of commercial and industrial air conditioning to include all aspects of conditioning the air, whether for human comfort or for manufacturing processes. We have divided air conditioning into the five major factors noted so that we may consider each one separately.

We, in this committee work, are interested not so much in these items as such, but we are vitally concerned in the load-building possibilities in each or all of these major factors. It is up to us to find every application of power to them and see to it that power is applied. We do not have to wait until we can apply power to the whole field to begin. We are not going to attain our objective if we do.

TEMPERATURE

First of our major factors is temperature, which is divided into heating and cooling. Of course, as we proceed you will realize that any application to a part of one factor may include some phase of one of the other major factors. It will be evident further that sometimes we go through several mediums to accomplish the final result, namely, the conditioning of the air involved.

Heating—So let's start with applications of electric power to heating. The applications named are not the only ones, but are indicative only. In air heating applications where power is involved, there may be noted:

Unit heaters of steam type with an electric fan wherein the same heating efficiency is obtained from one pound of metal as compared with 10 to 15 lb. of the old cast-iron type of radiators.

Unit air heaters of the electric-element type are applicable where periodical or accurately-controlled temperatures are necessary, or where large investment in plant is necessary to get other types of heat. Cheese rooms, process rooms of all descriptions, spot heat requirements, etc.

Cabinet heaters likewise replacing the antiquated cast-iron radiation. Such cabinets force air with fans throughout the space involved.

In the use of condensation or vacuum pumps, there are a large number of heating plants today that do not have such equipment. Some actually waste the hot condensate into the sewers.

Forced draft fans on hand-fired furnaces are economical for the owner.

Automatic heat, using coal stokers and oil burners, is increasing, both requiring small, but in the aggregate, large blocks of power.

Motor-operated valves and automatic controls on all types or air-heating plants use current. Many such controls use compressed air which is produced by power.

Water circulation pumps on any hot water heating system are really an economic necessity and rarely are found as yet except in some of the larger installations.

One of the most interesting possibilities for large blocks of power is in the electric boiler for air heating purposes, especially where such heat can be stored during off-peak periods. Four 200-gal. water tanks will store enough heat during the off-peak period to supply the 24-hr. heating requirements of a six- or seven-room house in our northern climates. Such tanks, standard in size, can be purchased for about $50 each. This same type of heat can be used in many sections, especially where other fuel is a problem. This one application of power to air conditioning is worth considerable study and ways will be found to apply it economically.

Cooling—Our second division under temperature is cooling and, of course, refrigeration comes immediately to our thought. One fact that really is fundamental is that the heat we are dealing with never is lost. In refrigeration, we simply are transferring the heat from one place to another. The heat that is removed, for instance, from the domestic electric refrigerator is taken from the box and transferred to the room in which the unit is located, thereby actually raising the temperature of the rest of the room.

Heretofore, we did not think of air conditioning as associated with commercial refrigeration, but by approaching commercial refrigeration from the standpoint of air conditioning we have found that vast improvements in the manufactured product and efficiency are possible. Meats and all perishable foods hold their weight, freshness and salability if kept in the properly conditioned air space. The old expansion coils so commonly used in refrigerators are being replaced by unit coolers with automatic defrosters. No more hot, cold or damp spots within a refrigerator, but now a constantly forced circulation of conditioned air maintaining a uniformly cold temperature throughout any room. All this takes power and, besides the present installations, this opens up new fields in commercial refrigeration. Many manufacturing processes require low air temperature, such as in the manufacture of candy, meat, delicatessen, dairy products and others. In the perishable food field alone, pre-cooling and chilling with conditioned air is a far step in preservation of food products.

Some processes do not require chilling, but necessitate reducing high temperatures to intermediate temperatures. Bread cooling is one wherein the saving in lost moisture or weight in cooling pays yearly the equipment cost for such cooling over the old way of open-air cooling. All bakery products come under this phase. Here, the quality of the product is improved greatly. Many other industrial applications will come to mind if this is given some study, and power is required in each one of them.

You have heard the story of the incubator salesman who called on the farmer to sell him an incubator to speed up production. To climax the story, the farmer made this remark, "What in hell do I care about the hens' time." I would like to listen in when this salesman sells this farmer some air conditioning equipment for his hen house, but just the same it is an economic possibility, especially in some of the hotter sections of the country where eggs for hatching are made a specialty. It has been found that only about 1/3 of the eggs laid during these hot summer days are fertile. It is found further that only about 1/3 of the chicks that are hatched ever reach the age of 6 months. In other words, about 11 per cent of the eggs produce 6-months-old chicks. By keeping the chickens in a cool, comfortable hen house and cooling the eggs shortly after they are laid, this low percentage skyrockets.

HUMIDITY

The second major factor in our discussion is humidity; this is broken down into humidification and dehumidification. To add moisture to our air takes power mostly in the form of heat. To take moisture out of the air takes equally large

quantities of power. The latter is accomplished mainly by refrigeration. Humidification can be accomplished by mechanical means and heat. We can break up water fine enough to be taken into the air in several ways: by high speed impellers throwing water against different surfaces, or by compressed air, or by boiling.

It is because of the fact that we can control humidities that the rayon plants can be placed in the centers of their raw material areas. Nearer at home, we have in every printing shop a prospect for humidity control. Printing paper worked in a dry atmosphere gathers static charges of electricity, which slows up production. Cards and paper dry out around the edges and curl and warp; this jams automatic machines and causes offsets in multi-color work, both of which are an economic loss. If the humidity in the shop is too high, the edges become wetter than the interior, with equally-disastrous results.

In countless other manufacturing processes, such as cigar, textile, cordage, laboratories and leather products, humidity and humidity control, all power consumers, are vital.

Dehumidification—The second division of our major humidity factor is dehumidification. The homemaker hangs her clothes on the lines to dehumidify them. Here, on dusty days, they gather countless particles of dust and bacteria. This is not an industrial problem as we are discussing industrial problems, but it brings out the point nevertheless. There are many processes where we accomplish exactly this same drying, but perhaps not quite so simply.

In these drying processes we extract moisture. When we dry air in many of our processes, we use refrigeration and literally freeze the water out of the air, and in some instances we introduce water-absorbing materials such as silica jell. It takes about 1½ hp. per ton of refrigeration, and one ton of refrigeration will remove only about 12 lbs. of water per hour from the air. Thus, where any volume of water is involved, the power requirements for its removal are sizable.

Many products, where drying is involved, are vastly improved in quality if this drying can be controlled. In ceramic plants, as much as 25 per cent of the products have been lost because of cracks produced during the drying period. By proper control of this drying process, this loss is eliminated; many such air conditioning installations have been paid for the first year through such savings.

Many chemicals depend for their quality, and even their production, on a very dry atmosphere. Perhaps closer to us is the manufacture and storage of electric cable, where a humidity as low as 1½ per cent is maintained. We are familiar with the effect of moisture in cables used in the electric industry and realize the necessity of keeping the moisture out.

In many processes using steam, we must get rid of large quantities of moisture, and in certain aging processes it is essential that we remove moisture from the air.

AIR CLEANING

Our next major factor is cleaning of air. Most of us live through enough dust storms and see enough smoke and have enough colds and other respiratory troubles to realize that dust is like the proverbial fly in summer—it is with us always. To a trained observer, there are few days of the year when the atmosphere is not literally saturated with dust. Let's remember, too, that bacteria ride on dust particles. Bacteria cause colds, sinus trouble, catarrh, quincy, laryngitis, meningitis, tuberculosis and a number of other diseases. Pulmonary damage caused by dust is enormous. Silicosis dust claims have bankrupted more than one industrial firm, and these claims are increasing. Tool grinders, sand blast operators, stone cutters, rock crusher operators and miners and many others are affected by this damage. We cannot filter air without moving it and we cannot move it without power.

To take commercial dust out of air, a centrifugal precipitator that works on the same principle as the cream separator is on the market. In many places, this will replace the bulky cyclone precipitator with which we are familiar.

In some processes this dust is valuable, as, for instance, powdered milk, on the recovery of which some of us have been working. An application of power to dust recovery is in the Cottrell process of precipitation, which is used largely to recover values from smelter fumes. Why cannot it be applied, with modifications perhaps, to other commercial and industrial dust-removal problems?

The economic loss to industry from dust is enormous, and the fact to keep before us is that air must be moved to be cleaned, and that to move it requires power.

AIR MOTION

The fourth major factor in our discussion of industrial and commercial air conditioning is air motion, or ventilation. In this field alone there is work for us all because we have just tickled the edges of the market, so to speak. You can go down any business street, or residence street, for that matter, and every establishment or home is a potential user of some ventilation.

The strangest thing about air motion is the lack of appreciation of its handling. Let's consider air, then, as so much visible water that we can see and feel, that has weight and volume. We can look at the handling of air in the same fashion and with the same mechanical tools that we handle water. Considered in this light, we will not go so far astray as we have in the past in the correct layout of our ventilation jobs. If we want to take heated air out of a store, we certainly are not going to accomplish it by stirring this hot air, and that's all thousands of so-called ventilating jobs are doing. It's just like trying to transport water by using an egg beater instead of a pump.

Every commercial institution and every industry has air-moving problems of some kind. Many of these problems are highly specialized, such as mine ventilation, but most of them are just simple air-moving problems. In some applications, it is best to create an air pressure and in others an air vacuum. For illustration, a certain restaurant has a 36-in. exhaust fan in the kitchen end of the room, which is a correct location for exhausting the air. However, whenever the fan runs the coal range does not work satisfactorily. The exhaust fan creates a slight vacuum, enough to prevent the chimney from drawing properly. In fact, it actually would be possible to reverse the travel in the smoke stack if such an arrangement were carried too far. In the storage of apples, bananas, oranges and other citrus fruits, ventilation is of vital importance to remove the carbon dioxide gases given off by the fruit. It has been found that with a relative humidity of 85 per cent and a temperature of 50 deg. and proper ventilation, oranges can be kept 6 months or more. We therefore can have fresh apples, oranges and other fruits practically every day of the year.

SUMMARY

This report has not gone into the relation of moisture in the air to human comfort and the bodily reaction to moisture, temperature and air motion. The general subject of air conditioning for comfort is covered in the appended discussions. It is interesting to note that the place that needs the most air conditioning is man made—our offices and places of business. In a certain dairy in New York state they conditioned the air within a cow barn and demonstrated that this increased the cows' efficiency 7 per cent. Think of what such an atmosphere might do for the human race! The economic loss each year in respiratory trouble is staggering. Colds alone chalk up the tidy sum of $500,000,000 each year. So, is it not all worth while?

This report has endeavored to point out a few of the many applications of power in the commercial and industrial air conditioning field. These loads are for the most part small, but in the aggregate they rapidly develop into quite large blocks of power, and because of their small individual size they make a diversified load very acceptable to us. The trend of affairs seems to indicate that, for the time being, we must look more carefully for the multiple number of small jobs for our load increases.

For the fullest possible discussion of this industrial and commercial air conditioning at the Sales Section meeting, the following, each an expert in his particular field, were asked to present discussions of assigned subjects as indicated below. These discussion are appended:

"Air Conditioning for Comfort," by E. S. Riley, Frigidaire Corp., San Francisco.

"Heating," by C. W. Larue, Wesix Co., Portland.
"Cooling," by A. G. Riddell, Liberty Coal & Ice Co., Portland; and S. J. Austin, York Ice Machine Co., Portland.
"Cleaning," by R. E. Chase, American Air Filter Corp., Tacoma.
"Air Motion," by H. A. Brod, B. F. Sturtevant Co., Portland.
"Humidity," by E. S. Turner, W. S. Turner & Co., Portland.
*"Odor Control," by Ray Montgomery, Montgomery Bros., San Francisco.

*Discussion not submitted for publication.

Air Conditioning for Comfort

By E. S. RILEY

AIR conditioning is a new industry. Unlike many new industries, it does not replace anything that we have or are using at the present time. It is on the same plane of public acceptance as the automobile industry was in 1912, the radio in 1923 and the electric refrigerator in 1925.

The automobile in 1912 was gaining its public acceptance, and little did the American people realize that it would be the most convenient and universal means of travel, replacing the old horse and buggy. Today, the American people have for their convenience and comfort 24,000,000 more automobiles than the total registration in all other countries.

The radio was introduced to the American people in 1923, replacing the old phonograph, and now is found in almost every home.

In 1925 the electric refrigerator was produced for the comfort, health and convenience of the American family, replacing the old inadequate methods of refrigeration, and today it has gained public acceptance to the extent that over 4,000,000 American homes are equipped with them.

These three great industries gained public acceptance by teaching the people, through advertising, of their need for these modern conveniences. Therefore, to secure the public's acceptance of air conditioning, it will be necessary for the public to understand thoroughly the fundamental need for such equipment.

In studying the human body, we learn that the normal human being maintains a temperature of 98.6 deg. F. If the body temperature varies either up or down, it is an indication of impaired physical well-being, and even a small variation may result in death.

We also know that people live in sub-zero temperatures in the East during the winter time and in temperatures as high as 122 deg. in certain areas in the West during the summer time, and we read in the papers that in other areas people are dying at temperatures of 85 deg.

We can see from this that the heat of the body, which is furnished by the food we eat, is radiated away to the air and objects around it, and if the rate of radiation is too great, we insulate the body with more clothing to attain a comfortable body heat; but when we are in temperatures of 100 deg. the heat of the body no longer can be liberated by radiation because the air and surrounding objects are warmer than the body; so nature, realizing this problem, saw that to maintain an even temperature it would be necessary to dissipate the heat by some other process, and arranged a flow of moisture through the pores to the surface skin, which we know as perspiration. This moisture or perspiration evaporates and, in so doing, absorbs heat, as we know any liquid changed to a vapor must have heat added to cause a change. We therefore can say that the body has a refrigerating system to absorb the heat from the body when in atmospheric temperatures near and above the body temperature of 98.6 deg. F.

From the following table we see that a large percentage of the total body heat is dissipated by evaporation of the perspiration from the skin:

	Atmospheric Temperatures		
	70 Deg.	86 Deg.	100 Deg.
	Per Cent		
1. Radiation, conduction and convection.....	73.0	38	
2. Evaporation of moisture from skin.....	14.5		
		62	100
3. Evaporation of moisture from lungs.....	7.2		
4. Warming up inspired air.....	3.5		
5. Warming up food ingested.....	1 8		

Air conditioning, where applied to enclosures for human occupancy, has been defined as the science of controlling the temperature, humidity and air motion to maintain the most suitable condition for the comfort, health and happiness of human beings.

Air conditioning has been known for many years, dating back to the primitive man who first learned to warm the air in his cave by a bonfire, later by the fireplace, then by the large old drum stove, and today by the hot air furnace and steam radiator system in the modern buildings and homes.

This type of air conditioning has been developed by many years of use under the name of "heating," but really it is "winter air conditioning" as it is dealing with the comfort of human beings. The "winter air conditioning" has developed now into air conditioning for twelve months of the year, and a modern plant performs six functions:

1. Heating.....Adding heat
2. Humidifying.....Adding moisture
3. Circulating.....Moving the air to even up temperature
4. Cleaning.....Removing soiled particles and odors
5. Refrigerating.....Removing heat
6. Dehumidifying.....Removing moisture

Each of these subjects will be discussed by men representing the manufacturers who produce equipment to perform these particular functions.

Now that we understand what air conditioning is, we must investigate the market. The market is divided into three sections: residential, commercial and industrial.

Residences will purchase air conditioning for comfort, health, convenience and pride of ownership, and will be purchased by those educated to realize that this new product will safeguard the health and provide comfort for his family and himself.

The commercial section includes a division of business establishments which need air conditioning to improve comfort conditions in order to maintain and increase personal efficiency of employes, or to maintain and increase business for a profit, such as private offices, professional men and business executives, directors' rooms, restaurants, hospitals, theatres and barber shops.

The industrial group includes manufacturers who need air conditioning in order to control certain manufacturing processes, such as candy dipping rooms, cigar manufacturing, bakeries and photographic developing rooms.

The foregoing is a brief outline on the subject of air conditioning, but I believe it gives a picture of the need, the ready market and the fact that it replaces nothing. Therefore, to put this giant industry in full motion, it must have the entire support of all manufacturers and distributors of air conditioning equipment.

*Air Heating**

By C. W. LARUE

AIR heating is the best known of the many phases embraced in the subject of air conditioning. The heating of air by electricity is somewhat new, but many changes and improvements have been made which we hope will cause electricity to play a major part in the scope of this new development.

Major electric air heating is probably one of the greatest load builders known to the industry, but due to an overselling of the idea by those salespeople unschooled in the fundamentals, and in many districts due to inefficient and otherwise unsatisfactory apparatus being used, together with the central station fear of high demand and low load factor, development of this class of load has lagged. Even if all these indictments were true, electric heating still should be uppermost in the minds of the utilities' executives, owing to the enormous potential possibilities for the sale of kilowatt-hours. In every part of our country there are countless applications, even at the higher rates, where electricity can be used more economically than any other method.

The recent development of thermostatically-controlled heat-

*Supplement to report of commercial and industrial air conditioning committee.

ers maintaining an accuracy of one degree or better with a wide range of adjustment, offers many new sales possibilities, both for the prevention of freezing during the cold season and for the maintenance of extremely high temperatures for certain special conditions. Drying rooms, water company chlorination rooms where constant temperatures must be maintained, organ lofts, instrument rooms and hot houses all are prospects for automatic electric heat.

The use of these automatic heaters has had a great effect on the reduction of ordinary electrical bills. In many cases, savings in current consumption ranging from 25 to 50 per cent have been recorded, as compared with non-automatic heaters. This is caused by the fact that the body does not respond very quickly to increased temperatures, and where non-automatic heaters are used for space heating the temperatures invariably will creep much higher than is required before the urge is felt to turn the heaters off. Recent tests conducted in Oregon showed that, with the same outside temperature, it required 80 per cent more current to maintain a room at 75 deg. F. than it did to maintain 70 deg. This, of course, is due to the fact that the greater the difference between inside and outside temperatures, the greater the radiation loss and naturally the more heat which will be required to compensate for the loss. The advent of the automatic air heater is a new deal for major air heating, and offers many new opportunities for their use.

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*Comfort Cooling and Air Conditioning With Ice**

By A. G. RIDDELL

IT IS not my purpose, in the brief time alloted me, to enter into a technical discussion of the use of ice in comfort cooling and air conditioning. Nor is it my purpose to discuss the history of the great development in this field, because, in a general way, we are familiar with the essential facts.

The opinion has been expressed by many who are close to the refrigeration and heating industry that the Northwest does not offer a fruitful field for the growth or popularity of comfort cooling or air conditioning. The reason advanced for this opinion was that the seasons, particularly summer, were too short and too irregular. I take the opposite view. Looking at the matter from the standpoint of my own industry, the fact that the seasons are somewhat irregular is all the more reason for expecting a wider adoption of ice as the cooling medium in this territory. There are two logical reasons for this contention. First, ice is inexpensive. Second, ice service is flexible, i.e., its delivery to the customer can be regulated quickly by the demands. Third, the initial cost of installation is small.

The history of every specialty in the markets of the world shows, with scarcely an exception, that those specialties had to be sold. People do not buy anything, in a broad sense, except food and clothes. Air conditioning and comfort cooling will be no exception to this general rule. Therefore, if we in the Northwest sell the idea, building our sales arguments around something more substantial than a new toy, additional social prestige and similar non-essentials, we shall succeed in spite of the weather. Sales appeals can be based upon considerations of health, comfort, prolonged life, beauty of furnishings and the like.

I am frank to admit that the record of progress made by the ice industry in this new field is not very imposing. There are reasons for this which we won't go into, but I do want to point out that the year 1932 showed an increase of about 400 per cent over 1931 in the use of ice as a cooling or conditioning medium. The number of permanent installations of which we have a definite record was 78. To give an idea of the general adaptability of ice, I will point out that these permanent installations fall into the following classifications: 12 offices, 4 specialty shops, 16 restaurants, 25 theatres, 1 auditorium, 4 funeral homes, 5 residences and 12 miscellaneous.

In the railroad field, good progress has been made. Although the possibilities there are not as great as in the residence or commercial field, nevertheless they are worthy of serious consideration. During the past year the following railroads had ice comfort cooling installations permanently made on their cars: Pennsylvania, Wabash, New York Central, Chicago & Eastern Illinois, Rock Island, New Haven and Boston & Maine. At the same time there were some 200 portable pre-coolers used for preparing Pullman cars for occupancy on the hot days. It is significant that these pre-coolers are being used on cars that have competitive types of equipment, because it has been found that with ice the cars can be pulled down to a desired temperature quicker and with less expense than with the machines.

The method used in Pullman installations is to build a bunker and water tank in one end of the car and to have the necessary motors and fans to circulate the water and air. In equipping a car that is already built, the cost is about $3,450 per car and the space occupied by the unit is one seat, or the space required by two passengers. The unit uses about 550 lb. of ice an hour and maintains an inside temperature of 78 deg. with all windows closed when the outside temperature is 90 deg. with the car traveling. The cost of equipping a new car is about $2,250.

In the residence and office field, as well as in small shops, beauty parlors, cafes, etc., faster progress is being made. For many of these places, the portable ice unit is ideal since it need be used only when required. Last year about 300 of these portables were sold. They vary in price from $50 to $250 and melt from 50 to 1,000 lb. of ice a day. Each is equipped with an electric motor. There will be thousands of these units in use in the near future. Already there is a large demand for the portables to be used in sick rooms and in hospitals.

The power companies have been cooperating with the ice industry in several localities, with a view to assisting in the development of the field now being exploited. The Detroit Edison Co. installed in its Farmer Street office an installation to cool 57,000 cu. ft. of space occupied nine hours daily. Ice consumption for July was 119.2 tons and the average outside temperature was 72.8 deg. During August, with an average temperature of 73 deg., 116.2 tons were melted. The most ice consumed in any one day was five tons. The system cost $6,100 to install. This same company is also carrying on an experiment with a complete ice installation in the home of one of its superintendents. Also, it is doing a considerable amount of experimentation with portables. The cooperation being given the ice industry in connection with the experiments at the research residence at the University of Illinois is worthy of much commendation. I will not discuss this work in detail, but I commend it to your careful study. In New England, New England Power Co. is giving splendid cooperation. I am happy to say that here in my own community we always have received the ready cooperation of our local companies, and I am confident that the results will be mutually beneficial.

*Supplement to report of commercial and industrial air conditioning committee.

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*Air Conditioning**

By S. J. AUSTIN

THIS paper is not a technical treatise on air conditioning, which no doubt would be interesting to you, but there is something more important to you than the general engineering features; that is, what does air conditioning mean to your business as an outlet for power service? Air conditioning has greater possibilities for power consumption than any other application of power since the days of electrification of steam power plants.

You undoubtedly are casually receptive to the subject of this paper, but if only a casual admission is made of the possibility that there might be some business in this field then this paper has not served its purpose. It is necessary that you be awakened to a serious and live realization of

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the volume of business that can be had, to bring about an earnest desire to work with manufacturers to foster air conditioning in the Northwest.

It makes no particular difference to manufacturers how much power service you sell, but it makes a lot of difference to you how much machinery we sell. We cannot sell the smallest plant without creating business for you. Your biggest job is not to sell power, but to see that the machinery is sold that must have your power service to operate. Our problem is your problem; you must work for us all the time and take your pay in increased power service.

In an attempt to excite some serious interest, the following list of air conditioning jobs in Washington, D.C., is recited with their horse-power connected. These jobs are:

	hp.
Library of Congress	80
Federal Warehouse	125
Senate Building	375
Archives Building	1,100
Wash. D. C. Post Office	1,500
Dept. of Justice Bldg.	2,100
Radio City	1,600

While it must be admitted that climatic conditions are not as favorable to the use of air conditioning equipment here as in other parts of the country, there is a big potential field both for industry and comfort.

Some of the uses of air conditioning already have been given, but the following list demonstrates the versatility of the application of this kind of equipment. Air conditioning in various parts of the country has been installed for the following businesses engaged in manufacturing the articles and products indicated: meat packing plants, bakeries, general food storage, candy manufacturing, fur storage, printing plants, tobacco curing, glue factories, piston ring manufacturing, rayon, rifles, salt, sand paper, sugar, silk, skins and hides, weaving rooms, watches, cocoa, automobiles, glass, air blast furnaces, munition factories, chewing gum, restaurants, beauty parlors, barber shops, offices, auditoriums, hospitals and theaters.

You cannot make any money by selling service for the equipment we manufacture until we have sold it, and selling it is not only our problem, but it is yours, too; you must help us so we may help you. The more air conditioning equipment we sell, the more power service will be required. Air conditioning means money in your pockets as well as ours. Let us work together for this big outlet of our services.

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*Air Cleaning**

By R. E. Chase

AIR FILTRATION is an essential part of air conditioning. It would be silly to condition dirty air. It would be like putting evening clothes on a tramp before giving him a bath and shave; before dolling up a stray air current in fancy temperature and humidity and sending him into polite society, you give him a scrubbing. You don't know where he's been or what he's got on him.

The housewife puts a doormat on the front porch because she has found that it is cheaper and easier to keep dirt out of the house than to remove it after it gets in. An air filter is a doormat where dirty air currents wipe their feet before coming in to play on white walls and linen.

There are many kinds of air filters. Some filters strain the air through cloth or paper. Some use pads filled with wire, glass wool or some fibrous material. Some cause the finely-divided air currents to turn in and out through labyrinthine passages, and the centrifugal force generated at these sharp turns throw the dust particles out against sticky surfaces coated with viscous oils. The most modern large filters are of the automatic type, which keep themselves clean and maintain uniform resistance to the air flow.

In common terminology, an air filter does not use water for cleaning the air. Such a machine is called an air washer, as distinguished from an air filter.

The smallest air filters I have seen in this territory are the wads of cotton which the workers in an arsenic smelter stuff in their nostrils. The smallest air filters we sell are about the size of an alarm clock and are used for cleaning the air supply of small air compressors, thus preventing abrasive dust from mixing with the lubricating oil on the surfaces of pistons and cylinders and causing excessive wear and also the gumming of valves.

Off-hand, I think the largest air filters in this territory are in a department store in Seattle handling 290,000 cu.ft. per minute. This job was designed for water sprays for conditioning and filters for cleaning, but before the job went in, the store owners looked over the plans and conceived the bright idea of eliminating the filters and letting the sprays double up on both conditioning and cleaning. After a few months trial, however, they found out what we already knew and had been trying to tell them. You can't clean air with a spray of water. Dust, particularly modern city dust, is coated with an oil film which comes from the tarry products of incompletely-burned fuel, whether wood, coal or oil, and also from automobile exhaust gases. These oil-coated dust particles will pass right through a water spray without getting wet. Each particle has a duck's back.

Anyway, the store owners soon found that they were pumping a lot of expensive water through their sprayers when they did not need either cooling or humidification, and the air was still dirty, to the detriment of goods and decorations. So the filters finally were installed in accordance with the original plan and everything is okeh.

Air filters consume electric power, which is probably good news to this audience. In other words, air filters offer an obstruction to the free flow of ventilating air and power must be used to shove it over. The average resistance of air filters is about 0.35 in. w.g. This is probably about 1/5 of the total resistance of the average ventilating system. This total resistance includes that of the ducts or air passages, the heating coils, the conditioning system and the air filters. Before you get through with it, you have employed considerable power.

In this connection I can cite a different example of how air filters lend to the use of power. I know a farmer with an asthmatic daughter. This farmer had electricity brought into his house so he could install an air filter in the window of his daughter's bedroom, and while he was about it he put in electric lights, an electric pump and an electric water heater. It is even reported that he bought his wife an electric washing machine. The filter started something.

Speaking of asthma, we sell a number of filters through the doctors for their hay fever and asthma patients. At the present time we get only the tough cases. After the doctor has exhausted all his serums and treatments, if the patient is still alive and has money left, the doctor will prescribe an air filter. We hope for the day when an enlightened public will try the filters first.

We also hope for the day when chambers of commerce, Rotarians and realtors will realize the advantage of having filtered air in hotels, apartments, hospitals and office buildings, so our hay fever population can stay at home and spend its money here instead of carrying it off to some distant resort. It is reported that Macy's department store in New York had to take the benches out of its bargain basement during the hay fever season because customers were being crowded out of the store. It doesn't take hay feverites very long to discover buildings with filtered air.

A few examples of buildings with filtered air in the Northwest are the new postoffices in Portland and Seattle, the Sears-Roebuck stores in Portland and Spokane, the art museums in Portland and Seattle, the Bank of California buildings in Tacoma and Seattle, the Dexter-Horton Bank, the Exchange Building in Seattle, all the new buildings at the University of Washington and high schools in Chehalis and Seattle. We got air filters in and paid for in St. Mark's Cathedral in Seattle just before they ran out of money. There also are the Marine Hospital and Harborview Hospial, both in Seattle. I would like to take an hour to discuss the Harborview's ultra-modern heating, ventilating and condition-

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ing system, in order to explain how the same system should be applied to apartment houses, hotels, office buildings, and others, and to show the big savings in fuel and redecorating expense, and also to show how much more electric power would be used. We have a great many other ventilating jobs, all the way down to residences. Every warm air furnace should have a fan and a filter for the sake of health, economy, comfort and the electric power industry.

We now come to industrial applications. Electrical machinery must be kept clean to prevent burn-outs, short-circuits, over-heating and excessive wear. We have sold air filters for protecting the generators and motors of the Northwestern Electric, Pacific Power and Light, The Washington Water Power, Phoenix Utility, Mountain States Power, and Puget Sound Power and Light companies. But we've only started. I've a lot of prospective customers for more air filters right here in this audience and I can't resist sticking in the remark that before you go out to sell air conditioning to the general public, you should be sure that you are setting them a good example.

The telephone company uses a lot of air filters, particularly in the new automatic exchanges where a little dust can cause a lot of trouble among the innumerable switches and contacts.

Intelligent owners of diesel engines and all kinds of internal combustion engines use air filters to prevent abrasive dust entering with the combustion air and causing damage to pistons, cylinders, valves and bearings. Chemical analysis of so-called carbon deposits shows that they are principally silica and lime from road dust. When automobiles are built for long life they will have efficient air filters in the intake.

Pulp and paper mills at Port Townsend, Port Angeles, Shelton, Hoquiam, Everett and Camas use air filters on their pulp dryers and paper machine ventilating systems to prevent specks and spots appearing on the finished product.

The Fleischmann Yeast Co., at Sumner, filters the air that bubbles through the yeast generating tanks. This prevents wild yeast spores like the proverbial travelling salesman from breaking into and wrecking the home life of the exclusive pedigreed and domesticated yeast families.

Filters also are needed for the coolers of breweries, for the difference between real beer and home brew depends upon the chaperonage by air filters of the sex life of the little beer bugs.

Then there is the long list of dust-producing industries that require air filters and dust collectors of one kind or another to protect themselves from their own corruption and also to make it possible for them to live among respectable neighbors. Such dusty industries are smelters, ore and rock-crushing plants, cement mills, flour mills, feed mills, fertilizer factories, lime and gypsum plants, sawmills and all kinds of woodworking plants, furniture factories, mattress works, linen mills and all kinds of grinding, sand-blasting, polishing and buffing operations, shoe repair shops, manufacturing jewellers and all kinds of chemical plants.

Some of these industries actually use air currents for transporting materials and products around plants, and when they reach destination the air has to be filtered clean again.

I have a small model of a dust precipitator called a Turboclone. This is not an air filter. It is a rotary cyclone or dust-collecting fan for very dusty industrial air. I also have a rather obsolete model of what is called an Airgard air filter which I use for lending around among the doctors as a hay-fever demonstrator. This is an example of the type of air filter which uses a dry cellulose medium. The Airgard is supposed to sit on the window sill and supply clean pollen-free air to a bedroom or office. It has its own little motor and blower.

I wish particularly to congratulate Mr. Bender for the excellent work he is doing in bringing air conditioning, the electrical industry and the general public together. This is just the kind of constructive effort that is needed these days to bring results.

*Humidity**

By E. S. TURNER

HUMIDITY is one of the most interesting of the major factors of air conditioning. Humidity is moisture in the air. The necessity of accurate humidity control is of great importance both commercially and industrially, as pointed out by Mr. Bender in his introductory paper.

We have in nature all of the elements of humidity control: humidification or the addition of moisture to the air and dehumidification or the extraction of moisture from the air. Moisture rapidly evaporates from a wet street, due to the action of the sun and air motion. The sun provides the necessary heat to vaporize the moisture and the air motion keeps bringing dry air in contact with the moisture. This is humidification.

The capacity of air to carry or absorb moisture depends upon the temperature of the air; the higher the temperature the more moisture the air will absorb and the lower the temperature the less moisture the air will carry. As air containing moisture is cooled, it reaches a point of saturation, or 100 per cent relative humidity. This is known as the dew point. Further cooling will result in the condensation of moisture and the elimination of this moisture from the air. We are familiar with dew on the grass in the morning. This is caused by the night air being chilled below the dew point and, as a result, moisture condenses and is deposited on the ground.

In air conditioning, our problem is to control the action of humidification and dehumidification so as to maintain definite predetermined humidity conditions in the space to be conditioned. There are several methods of accomplishing this result, but for the larger commercial and industrial installations the air washer is probably the most widely used. The air washer consists of a bank, or banks, of sprays through which the air is passed.

To humidify with an air washer, heat is applied either to the spray water or to the incoming air, this heat being sufficient to vaporize a portion of the spray water. The degree of humidification depends on the amount of heat supplied and can be regulated automatically by means of instruments located in the space to be conditioned.

To dehumidify, air must be cooled below the dew point or point of saturation. To accomplish this result with a washer, cold water must be supplied to the sprays. This water, if in sufficient quantity and of low enough temperature, will condense moisture from the air. The moisture mixes with the spray water and is carried off with it. Refrigeration of the mechanical type is most commonly used either in connection with water or brine, depending upon the degree of temperature and humidity to be maintained. Well water, when available in sufficient quantities and at low enough temperatures, often is used for dehumidification in connection with air conditioning systems.

In Portland, we have examples of the air-washer type of humidity control of various types. The Broadway and Paramount theaters, as well as the new Meier & Frank beauty salon, are equipped with mechanical refrigeration and air washers. The United Artists Theater is equipped with a washer and a large capacity well producing 52-deg. water. The new Meier & Frank auditorium is equipped with a recirculating type air washer which provides evaporative cooling and humidification without provision for dehumidification.

In addition to the problem of controlling humidity in air conditioning systems, we have the allied problems of drying and vapor absorption. By drying we mean the removal of moisture from the product being manufactured or processed. We have in the Northwest many such industries; prunes and other fruits, hops and lumber. Drying, of course, requires the application of heat to raise the moisture-carrying capacity of the air coming in contact with the product to be dried. In drying, it usually is necessary to

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control the humidity so as not to dry too rapidly and "case harden" the product. This is done by recirculating a portion of the moist air and mixing it with the dry air so as to obtain the desired humidity.

The problem of vapor absorption is encountered in paper mills, canneries and similar industries. Large amounts of moisture are liberated in the manufacturing process. This moisture, if not removed, causes condensation and consequent deterioration of the walls and roof of the building; allows reabsorption of moisture by the finished product; causes contamination of the product by dirt carried by condensation dripping from the roof and, in many cases, causes fog which interferes with the supervision of the process.

In handling problems of vapor absorption, it is customary to exhaust air from a point close to the source of vapor, in this way removing it before it has an opportunity to spread through the room. Heat usually is added to maintain the air in the room well above the dew point, so that condensation will not occur.

Humidity is a broad subject and its control, particularly in commercial and industrial applications, is more or less complicated. When you have a problem of this nature, it is suggested that you call in a representative of one of the nationally-known air conditioning companies. Competent engineers are available to solve your problems.

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*Air Motion**

By HARRY A. BROD

AIR conditioning cannot be accomplished except through the agency of moving air. Air acts as a conveyor of heat or cold from the apparatus where it is produced to the point of usage. Even the smallest unit conditioner for air conditioning in a single room must have a fan for providing circulation. A fan is one of the principal items of the air conditioning system. Many good jobs are put on the rocks by faulty application of the fan. Therefore, it is opportune to consider the two main types of fans, and where they should be used.

The centrifugal, or housed, fan covers that family of fans known on the market as "Multivane," "Steel Plate" or "Silentvane." This type should be used where there is resistance, such as air cleaning equipment, duct systems, air washers, heating coils, cooling coils, etc. This family of fans has a characteristic that is important. The power falls off as the resistance is increased for any given speed.

The second important type of fan is the propeller or disk fan. Desk fans used in the office, wall fans seen commonly in restaurants, belong to this general classification. They should be used only where there is little or no duck work. It can be said that the housed fan is generally the more acceptable on account of noise. The horsepower of these fans increases as the resistance is increased.

Since you are liable to have some experience with fans, it would be well to mention some of the fundamental laws. The volume of air moved varies directly as the speed, and the power varies as the cube of the speed. Therefore, if any of you were attempting to increase the capacity of the fan in your own home by doubling the speed, you must be prepared to provide eight times the power. Be careful when making changes in speeds.

It is generally accepted that 30 cu. ft. of air per person is the proper amount for ventilating schools, theaters, churches, etc. This has been found sufficient to carry in the necessary heat for heating the building, and also the necessary refrigeration, if it is a cooling system. Therefore, a thousand-seat theater would require 30,000 cu. ft. of air per minute. This would require about a 10-hp. motor for the supply fan and about a 5 hp. motor for the exhaust fan. So ventilation can be expressed readily in terms of power.

Having determined the volume, the next important consideration is the velocity in the ducts. We generally use about 1,000 ft. per min. for the ordinary fan job, and the reason that we do not use higher velocities is because of the possibility of trouble from noise. If we use twice the velocity the resistance would have just four times the pressure, due to the fact that the resistance varies as the square of the velocity. This higher pressure would require a much higher speed of the fan, which would result in noise.

Noise is the big problem of the air engineer. Considerable work has been done in the acoustical treatment of ducts, and sound traps are made by providing felt baffles which work on the principle that sound travels on a straight line. If baffles are placed in the air stream, the noise will be absorbed by the felt. The air passing through is relieved of its cargo of noise. As air conditioning equipment involves air motion and fan equipment, my parting word is, beware of noise.

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*Commercial and Industrial Lighting**

THIS report has been prepared with the object in view of giving to the electrical contractor information that will enable him to show the business man how to save dollars in the wiring installation by spending more money. This can be accomplished through sound design practice instead of the present haphazard installation practice and recognition of the fact that the cheapest installation is not one completed at the lowest original cost. Coupled with this must be a sound knowledge of the value of light in all its ramifications to modern business.

Any electrical contractor who is willing to devote his spare moments to the study of illumination design and lighting sales arguments will certainly be repaid for these efforts through increased profits in the future.

VALUE OF LIGHTING BUSINESS TO ELECTRICAL CONTRACTOR

The lighting customer is the very foundation upon which the electrical contracting business is built. Seldom do other types of electrical installations arise in sufficient quantity to sustain the contractor's organization, nor are other types susceptible to organized campaigns, modernization or rehabilitation.

By virtue of this situation, the electrical contractor is in a strategic position to sell, at a profit to himself, a complete wiring and lighting system that will mean customer satisfaction.

In brief, were it not for the lighting customers there would be no electrical contracting business.

Lighting business could mean a great deal to the electrical contractor if he would put forth some effort in studying illumination designing and the value of light to merchandising.

Such knowledge would bring about a closer contact with the business and professional men, through which he could sell service of merit, as these men do not have the time to concern themselves with what constitutes good lighting for their business and, therefore, must depend upon the electrical contractor to supply them the information. These associations in contacting and selling the story of good lighting also should mean a great deal toward rounding out his life and bringing about an appreciation of his standing in the community.

Good lighting can be sold every day in the year and provides an enormous field in which to work. It is sold for RESULTS—which reduces competition to a minimum—not

*Report of the commercial and industrial lighting committee, industrial and commercial sales bureau, Sales Section, H. C. McDaniel, Pacific Power & Light Co., chairman.
Electrical Products Consolidated: H. C. Underwood.
Idaho Power Co.: O. C. Mayer.
Incandescent Lamp Dept. of G-E Co.: N. R. O'Farrell.
Northwestern Electric Co.: M. S. Glenn.
Puget Sound Power & Light Co.: Floyd Snyder
Utah Power & Light Co.: L. B. Gawan.
The Washington Water Power Co.: L. V. Ross.
Westinghouse Electric & Manufacturing Co.: G. M. Boyd.
Oregon State Electrical Inspector: George Pettingell.

for a PRICE. To obtain results, equipment sold must be the best; standard quality and standard prices must be maintained at all times.

RESULTS OF A POOR LIGHTING JOB

Little or no profit for the electrical contractor.
Complete wiring system from service switch on too small —no provision for future expansion.
Insufficient number of circuits.
Circuit wires too small—loss of voltage and power.
Lamps operating inefficiently—under voltage.
Distribution of light poor because of wide spacing between fixtures.
Intensity of illumination not what it should be—annoying shadows.
Customer paid for something he did not get, which means:
Loss of customer good will,
Loss of return business, and
Loss of prestige and confidence.

RESULTS OF A GOOD LIGHTING JOB

Reasonable profit for the electrical contractor.
Wiring system adequate—provides for future expansion.
Ample number of circuits.
No voltage or power loss.
Illumination correct—proper intensity—even distribution—no shadows.
Customer satisfied—business good—clerks cheerful—less returned goods—customers complimentary.
Good will toward electrical contractor maintained—prestige unquestioned—future business assured.
A real advertisement for the community.

CHOICE OF LIGHTING SYSTEM

In selecting a lighting system for any type of store, it must be kept in mind constantly that the problem is not merely the illumination of a building, which may be accomplished in many ways, but that the primary purpose of a store's lighting system is to secure maximum turn-over, sales volume and profit, at the highest efficiency and least cost of operation.

It must be realized that the use of artificial lighting in the commercial field has undergone radical changes, improvements and diversity of application during the past ten years. What may have been considered efficient and effective lighting a few years ago would prove totally inadequate today. Furthermore, both merchants and customers have become progressively more light conscious due to experience with increased intensities and more prolific use of artificial illumination. It is, therefore, quite important to maintain such adjustments in lighting methods as will conform with these constantly changing conditions and standards.

Illumination for merchandising purposes comprises other factors of equal importance with intensity, such as distribution, diffusion, color, reflection, projection, absorption, shadow and silhouette effects.

The choice of lighting for any department or line of merchandise should take into consideration the characteristics which tend to emphasize the value, texture, construction, color and novelty of the merchandise offered and, to a certain degree, sales psychology; also what may be referred to as lighting for quality selection, as distinguished from lighting which emphasizes the utilitarian and artistic characteristics of merchandise. Naturally, merchandise used or worn under artificial illumination should be selected under similar lighting conditions, while merchandise for street or daylight wear, where color values are of importance, should be selected under natural or daylight illumination.

A reasonable working knowledge of the three types of lighting systems and the advantages of each type will pay dividends. These are classified as:

Direct lighting system,
Semi-direct lighting system, and
Totally-indirect lighting system.

The underlying principle of all lighting fixtures is to control the light emitted by the incandescent lamp. With the modern efficient lamps, the light source must be concealed and controlled to protect the eyes from harmful glare and to direct the light to the working area.

The direct lighting system employs fixtures which send the preponderance of light, over fifty per cent, direct to the counters, display tables, desks, etc. It is usually characterized by intense highlights and dense shadows with considerable direct and reflected glare. It is most suitable for those locations where activities are mostly physical, as distinguished from mental, and particularly where the users are moving about most of the time. Examples: stores, corridors, storage spaces, large manufacturing processes, sports and so on. Both open reflectors and enclosed glassware come under this heading.

Totally-indirect lighting utilizes the ceiling and upper side walls for reflection, redirection and diffusion of the light given off by the lamp in the fixture. It is characterized by its softness, freedom from glare and dense shadows. It is the most comfortable lighting for the eyes that has ever been developed and therefore most appropriate where eye work is predominate. Examples: offices, libraries, banks, schools, drafting rooms, bookkeeping offices, music studios, and so on. Because of the freedom from annoying glare it is used almost exclusively in modern churches and theaters. Because of the apparent dignity that indirect lighting lends to an interior, it is proving exceedingly popular in many types of stores, such as beauty shops, cosmetic or perfume shops, confectioneries, haberdasheries, ladies ready-to-wear and other specialty shops, restaurants, financial institutions, and, particularly, department stores.

Semi-indirect lighting is a more or less nondescript classification covering all the possible variations between totally-direct lighting and totally-indirect lighting. Obviously, any conclusion as to its usefulness in a given case must depend upon some knowledge as to how near a proposed installation will come to either possible extreme. If equipment is sufficiently indirect so as to eliminate the possibility of reflected glare from desk work, then it is likely that more efficient lighting could be obtained from equipment designed for totally-indirect distribution. On the other hand, if lighting is used that is only a few notches removed from direct lighting, is is likely that the loss of light due to the greater absorption of dense glass will more than offset any advantages from the negligible reduction in glare.

In conjunction with the three systems of general illumination, there is often a need for localized lighting, decorative lighting and display lighting. Localized lighting includes such illumination as is required to supplement the general lighting system in such portions of the premises used to emphasize special features of the building or merchandise, work rooms and utility departments. Decorative lighting includes such special lighting as may be required for purely decorative or architectural purposes, with proper consideration as to type, color and intensity. Display lighting embraces such additional lighting as may be required for emphasizing the display of merchandise, which would include floor cases, display cases, wall cases, show windows, etc.

The efficiency of the direct lighting unit in terms of illumination on the counters, display tables, desks, etc., generally is greater than that of either the semi- or totally-indirect fixtures when using a given sized lamp. Assuming unity for the direct lighting fixture, the ratio is 1.3 for the semi-indirect fixture and 1.5 for the totally-indirect fixture. The depreciation of the direct lighting fixture is not as rapid as it is for either the semi- or totally-indirect fixture, due to the fact that less light is absorbed by dust and other particles deposited on or in the fixtures. The depreciation of the open bowl semi- or totally-indirect fixture is the highest of any of the lighting fixtures for a given period of time.

However, the actual efficiency of the fixture should not be the sole determining factor in choosing a lighting system. Glare, both direct and reflected, is an evil that must be overcome in office lighting, and for this reason the totally-indirect system is preferred as the deleterious effects of glare are more costly than the difference in lighting costs between the direct and indirect systems.

The lighted appearance of the room must be considered in selecting lighting systems. The industrial plant, where lighted

appearance is not important, but where efficiency and plenty of good light on the work benches is needed, is most economically lighted with metal or opaque reflectors.

The small store, where lighted appearance and efficiency are essential, is best adapted to the direct lighting system using enclosing glassware, so that the preponderance of light is directed to the wall cases, counters and table displays. Care must be exercised in spacing the outlets or a spotty lighting job will result. Do not mount the lighting fixtures too low, for by so doing their very purpose is defeated—distributing and directing light. A minimum of 10 ft. should be maintained for most stores, and where ceiling heights of 16 ft. are encountered, a 13-ft. mounting height should be used. If you are afforded the opportunity, recommend light colors for the finish of the ceiling, walls, cases and counters, for it will mean a lighter store, day or night. Recommend a cleaning interval of once every month.

The illumination required in various stores is summarized on the basis of intensity values of 10 to 15 foot candles as high, 6 to 10 foot candles as medium and 3 to 6 foot candles as low. These values, however, are arbitrary and subject to such adjustment as may be necessary to bring them within practical requirements.

Lines of merchandise, including hosiery, leather goods, gloves, laces and trimmings, toilet goods, notions, men's furnishings, novelty jewelry, handkerchiefs, stationery, etc., are for the most part carried in floor cases and on tables or counters and share in the relatively high intensity of the general lighting. However, these lines depend largely upon local reflector case lighting, which should be employed generally. Local artificial or daylight facilities also should be provided where required.

Diamonds and jewelry should have relatively high intensity of general lighting, with reflector case lighting as required. Novelty jewelry on open display can be emphasized further by appropriate local lighting. Piece goods, including silks, velvets and woolens, require relatively high intensity, due to the high absorption factor of the darker shades, and the sales value is dependent largely upon the general lighting system, supplemented by local daylight or color-matching facilities.

Domestics, prints and other cotton textiles should have lighting of medium intensity of the same character, also color-matching facilities.

Corsets, silk and rayon underwear and lingerie require medium lighting, with localized display case lighting.

White goods, blankets and bedding require lighting of fairly good intensity and all display cases for fancy lines should have localized reflector illumination.

Women's and children's shoes should have general lighting of fairly good intensity, with such reflector lighting as is required for display cases.

Men's and Boys' clothing require medium intensity with such localized reflector lighting as required in display cases and evening and daylight try-on rooms.

Women's and Misses' ready-to-wear should be provided with lighting of fairly high intensity over the entire sales area with such localized reflector lighting as required in costume display cases. Special evening and artificial daylight rooms also are essential to this department.

Millinery requires general lighting of medium intensity, together with such local and decorative lighting as required.

Curtains and draperies require general lighting of medium intensity, together with localized daylight or color-matching facilities.

Cut glass, china and stemware lean to lighting of medium intensity, preferably of the indirect type, with the exception of merchandise displayed on shelving, which must be supplemented by localized or reflector lighting. These lines may be emphasized further by the use of indirect, portable or table lamps.

Floor coverings, such as domestic rugs and carpets, demand lighting of sufficient intensity and character to bring out the design, quality, colors and construction of the fabric and pile. Some purchasers prefer to select rugs and carpets under daylight or natural illumination, while others prefer artificial lighting. These lines also offer an opportunity for the use of localized and spot lighting, especially oriental rugs.

Furniture, bric-a-brac, antiques and objects d'art require lighting of rather low intensity and warmth, offering considerable opportunity for decorative and color lighting.

Sporting goods require medium general lighting with such reflector case lighting as required; colored and spot lighting may be employed advantageously in special displays.

Restaurants and tea rooms require lighting of relatively moderate intensity, together with decorative and local table lighting.

Drug stores usually employ medium-wattage units arranged on close centers on studded ceilings, together with considerable localized lighting, including display cases. Where there are fountains and lunch rooms special decorative and booth lighting is provided. The value of well-lighted show window displays is fully recognized and full advantage taken of their sales-producing features.

Grocery stores and meat markets generally employ lighting of medium intensity and a limited amount of display lighting. Show windows are not, as a rule, utilized to full advantage. An exception may be made in this regard in some of the chain stores, as syndicates are recognizing the value of show window display and are making more extensive use of this.

The specialty shop, which usually is more elaborately decorated than the very small store, requires a lighted appearance in keeping with the surroundings and it is here that the semi-indirect system is adaptable. It also is used frequently in school class rooms and office buildings. When used in schools and offices, extreme care must be taken in spacing the outlets, selecting the fixtures and mounting them. Light ceilings and upper side walls are essential if the system is to operate with any degree of efficiency. Recommend a cleaning interval of once every month.

Offices of necessity must present a lighted appearance in keeping with their appointments and it is here that the totally-indirect system is adaptable. Because of the complete absence of glare, freedom from shadows and strong horizontal illumination, no better system could be used for the office or school room. Large department stores also are using this system, for it gives a room an appearance of dignity, richness and fineness that no other lighting system can create. Totally-indirect lighting systems require light ceilings and upper side walls and should never be considered if this condition does not exist. Recommend a cleaning interval of once every month.

THE LIGHTING FUTURE

Lighting in its present day form is merely in its infancy, and its future prospects are very good. The present tendency of future lighting is the combined use of incandescent lamps and gaseous tube conductors. The illumination produced by this combination is equaled only by daylight. Yellow, green, blue and violet rays combined with the red rays of the incandescent lamp make possible this daylight effect. This synthetic daylight can be produced very efficiently because the effect is produced by addition rather than subtraction and it is possible to produce almost any degree of daylight. One feature of this combination is its flexibility, as the intensity and quality of light produced easily can be changed as desired.

At the present time the use of the sodium lamp is considerably limited, due to the fact that the light produced is almost completely monochromatic. Light of this character may at some future date be adaptable for utilitarian lighting, such as street lighting, and may prove to be very satisfactory —particularly due to its high efficiency in lumen output.

Show case lighting is a new application for gaseous tubes. By combining the primary colors and using the correct reflector, these can be used inside show cases. Because of the constant light along the full length of the case, the merchandise stands out in detail. It is such a cool light that it can be installed in practically every show case the customer has at present.

There are considerable developments at the present time in connection with the use of ultraviolet sources for general illumination. A number of lighting fixtures have been developed during the past year using ultraviolet lamps supplemented with the regular incandescent Mazda lamps. This combination is usually referred to as dual-purpose lighting.

The main purpose of this type of lighting is to produce a mild ultraviolet radiation that can be used over a long period of time for the purpose of health maintenance. The incandescent lamps supply light for vision.

Architectural lighting, so called because it is an integral part of the interior, is rapidly gaining recognition by architects and designers because it offers possibilities hitherto unknown in creating lighting effects. Exposed beams, pilasters, false windows, luminous ceiling boxes and so on comprise the most common form of design practice at present.

Of these things you can be assured: that in the future the efficiencies of the incandescent lamp will be increased, that other lighting sources will be developed, that the use of combinations and equipment for producing synthetic daylight will increase, and that the use of ultraviolet sources for general illumination and health maintenance will become quite common.

MAINTENANCE—ITS VALUE TO GOOD LIGHTING

It has been said that if all our lighting installations and their immediate surroundings could be cleaned and reconditioned today, then the illumination that this nation would receive tonight would be nearly twice the amount that it enjoyed last night!

Where maintenance is poor and lighting systems depreciate, the losses due to neglect roughly may be classified as follows:

1. Dirty lamps and accessories.
2. Darkened or discolored walls and ceilings.
3. Lamp bulbs of poor quality or low efficiency.
4. Empty sockets and unobserved burnouts.
5. Aged lamps past their prime of usefulness.
6. Under-voltage burning of lamps.
7. Improper combination of lamp and reflector.

A continuous depreciation due to the continuing deposits of dust on reflectors and the continual aging of lamps is expected. However, this falling off in efficiency is not a straight-line function. Usually the greater losses occur in the first month or six weeks. Dust deposited upon old dust is not so costly as is the first thin layer.

"How should lighting equipment be cleaned and how often?" The experience of past years has shown that bulbs and reflectors should be wiped free of dust at least once a month. Except in unusually dirty locations they should be washed at least once every sixty days. It is not a bad plan to alternate dry and wet cleaning.

One plan that works quite successfully for reminding the individual that it is time to wash the lighting fixtures is to circle the first of each month on the calendar with a red or blue pencil. In this circle note, "clean fixtures." Try this the next time you install a new lighting system for one of your customers.

WHEN AND WHERE TO SELL GOOD LIGHTING

In the Spring—

Floodlighting: Auto camps, garages, service stations, parking areas, roadside stands, markets, recreational centers, etc.

Window and Interior Lighting: Confectionery stores, restaurants, drug stores, billiard parlors, magazine stands, stores being remodeled, etc.

In the Summer—

Flood'ighting: Follow up spring activities.

Window and Interior Lighting: Schools, libraries, reading rooms and other buildings not being used extensively during the summer months. Don't forget the remodel jobs.

In the Fall—

Window and Interior Lighting: Dry goods stores, men's shops, women's shops, shoe stores, hardware stores, jewelry stores, furniture stores, bakery shops, grocery stores, florist shops, notion stores, radio shops, specialty shops, beauty parlors, barber shops and other merchants using and needing good lighting in their business.

Office and Reading Lighting: Offices, schools, banks, clubrooms, libraries, reading rooms, hotels, courthouses, jewelers, architects and other interiors where good reading vision is necessary.

Industrial Lighting: Printers, machine shops, garage repair shops, sawmills, flour mills, iron foundries, cabinet making, furniture manufacturing, laundries, bakeries, packing plants, canneries and wherever good lighting will be of benefit to employer and employee.

In the Winter—

Window and Interior Lighting: Keep your fall activities alive by follow-up calls and demonstrations. This goes for office and reading lighting and industrial lighting as well.

Sell decorative lighting for Christmas.

HOW TO SELL A GOOD JOB OF LIGHTING

There is only one sure way to sell good lighting. Show your prospect, by a carefully planned demonstration, what good lighting will do for him:

By attracting attention to his windows.
By converting shoppers into buyers.
By enabling him to display his merchandise to the best advantage.
By reducing the quantity of returned goods.
By making his establishment stand out from the rest of the stores in his community.
By combining advertising and operating expenses.
By reducing spoilage, soiled goods, delayed decisions.

There is no rule-of-thumb method for selling lighting to merchants. Local conditions always dictate. The type of customer, kind of business and location all influence any sales plan. Find out what he needs, how to satisfy this need, show him that he needs it and you have made a sale. The architect working on a set of plans must see more quickly and more accurately than the bootblack shining shoes. The jeweler and grocer each has his individual problems, which is true of every other merchant.

However, there are two rules that must be observed regardless of the case: Bare lamps, without shades or reflectors, are never efficient and are actually detrimental to vision; and the copper capacity, outlet spacing, mounting height and choice of fixture are the heart of a good lighting job.

Your experience, combined with that of your jobber's salesman, your manufacturer's representative and your power company's lighting man, will assure you and your customer a satisfactory installation.

GOOD LIGHTING AND THE SMALL MERCHANT—WHAT IT MEANS

For the Store—

More rapid selection of merchandise.
Increased observation of other articles on display.
Enhances the value of the merchandise being sold.
More attractive and better store displays.
Overcomes competition by attracting trade from the poorly-lighted store.
Permits middle-of-block location without loss of business.
Every foot of floor space is utilized—no dark corners.
Makes possible color selection and color matching.
More inviting from outside.
A cheerful and clean store.
Reflects on management.

It is, perhaps, not an extravagant statement to say that in the development of artificial lighting is written the story of the growth and importance of retail merchandising throughout the world.

Primitive merchandising, dating back many centuries, was conducted largely in out-of-door bazaars and booths along the principal avenues of travel, and trading was conducted principally during daylight hours. At a later date came shops and indoor booths, requiring some means of illumination, obtained from oil lamps and candles, to be followed in later centuries by other forms of illumination, such as kerosene lamps and the fish-tail gas burner, to be superseded by the gas mantle, arc lamp and later by the carbon filament incandescent lamp, culminating in the modern type of tungsten gas-filled lamp.

While primitive modes of illumination probably served the single purpose of aiding in the display and sale of goods,

modern methods of store lighting serve many purposes aside from this function, embracing utility, ornamentation, safety and sanitation. Light adds to cheerfulness, comfort, beauty and health, as well as convenience—all of immeasurable importance in the economic and social life of the community—and in this way has been an outstanding contribution to modern civilization.

Good lighting is of value to the small merchant because good lighting is good business. He is competing with neighborhood stores handling the same line of merchandise, with individual departments of large department stores and with the small specialty shop as well. Obviously, good lighting enables him to display his wares to best advantage.

Display windows are his stage and the stage must be properly "set" and lighted to attract the pedestrian. Attention thus gained reminds the passerby of something he has needed for a long time and he enters to buy it. Once in the store, he sees other things he needs, providing the interior is well lighted, and the 25 c. sale is turned into a dollar purchase. Were the store interior poorly lighted, 25 c. is all the customer would have spent. If the windows had not been properly lighted, "No Sale" would have been rung up on the cash register. Therefore, it goes without saying that good lighting in the windows and good lighting in the store interior are inseparable. Never should one be installed without the other as they are the "primary" colors of good business, and when properly mixed are "secondary" to none in producing sales "effects."

By virtue of its physical size, the small store lacks the impressiveness and consequent prestige which mere size gives. The public generally knows little about this store and obviously it is not talked about. Transients are looked to for a large volume of its business. Local purchases are the results of seeing something in the window that is needed. The location is such that it is easily passed by. All of these handicaps are overcome readily with good lighting.

Unusual lighting will offset the size obstacle and make the small store impressive. Because of the unique lighting, people will notice the store and talk about it. The transient will be attracted to it for, irrespective of what may be said, human beings are attracted to bright lights.

If the store is located in an old building with the usual high ceilings, a totally-indirect lighting system will provide the illusion of lowered ceilings. The semi-indirect system causes the low-ceilinged room to take on greater height. It should be remembered that these systems need a light ceiling to efficiently illuminate the interior.

In the 16- to 20-ft. store, install two rows of ceiling type fixtures or indirect fixtures, instead of one row, and the store will appear much wider. Care should be exercised in spacing the rows of fixtures. The distance from the wall to the first row of fixtures should be nearer one-third the distance between the two rows of fixtures than the usual one-half of the distance between rows, provided this spacing does not place the lighting fixtures too near the wall cases. This is a desirable feature from the illumination standpoint as well, as it prevents customers standing in their own light when examining counter displays.

For the Display Window—

Doubles attraction and sales power of the best advertising medium.
Ties in with other advertising.
Enables merchandise on display to appear at its worth.
Brings people into the store.

The value of show window display as an advertising medium long has been recognized by all merchants and it is generally conceded to be worth three to four times as much as any other form of publicity in the production of sales. It is, therefore, a matter of much concern to any store with show windows of ample size that illumination of proper character and intensity be provided.

The correct illumination of show windows calls for very careful designing in the size and location of units, as well as the character and the type of reflectors employed. It is also of extreme importance, in case of corner windows or returns in entrances, to provide screening as required to mask the glare from exposed lighting sources.

Show windows offer an excellent opportunity for the exercise of a great deal of ingenuity in the arrangement of special lighting features and the employment of color and spotlighting. Provision should be made for the accommodation of such facilities.

The manner in which human beings are attracted to light is well known. Foot traffic flow has been changed from one side of the street to the other through the use of light in the windows. Herein lies the solution to increased window value for the small merchant. The greater the number of people seeing the goods on display, the better the chance of creating a desire to enter the store—if not to purchase, at least with the desire for further investigation.

Good Lighting for the Small Office—

Assures easy and accurate vision which makes for efficiency.
Reduces eyestrain, headaches, fatigues and absences.
Improves morale by creating an atmosphere of cheerfulness.
Creates good impression on customer.
Cheaper rent quarters made livable by good lighting.

The four fundamentals with which we must concern ourselves if we are to understand the basic principles of seeing are: size, brightness, contrast and time.

The size of an object is measured by the oculist in minutes of angle subtended, or by most of us in physical dimensions at a given distance. Normal vision or acuity is considered to be one minute, which is equivalent to a ⅜-in. rod at a distance of 100 ft. While the eye evolved under seeing conditions requiring distant vision, usually of large details and incidentally under high intensities, it is required today to observe minute details accurately and quickly and often for long periods of time.

By brightness is meant the light reflected from an object to the eye. We do not see the object; we do not see the light falling upon the object; we do not even see the light reflected from the object in any other direction than toward our eyes, because the eye is merely a measuring instrument to detect and classify the light rays which enter it. A bright beam directed upon a clean and perfect mirror would not even be discerned by us, in observing the mirror, unless we should be in the reflected path of that beam. Usually our problems involve materials with mat surfaces and general illumination, and the brightness is then largely a matter of footcandles intensity of illumination times reflection factor. It is very important to bear this in mind.

In contrast, as here used, differences in color must be eliminated. Colors are important because of the varying physical and mental reactions stimulated by them, and because of their varying reflection factors, and therefore brightnesses under similar intensities of illumination—an example of both being found in highway signs. Colors have their influence on seeing and must be considered qualitatively in analyzing any seeing problem. But obviously it would be impossible to include them in a fundamental quantitative study because of the enormous increase in number of conditions which would have to be taken into account. So contrast is considered only as it involves shades of black and white. A jet black mark on an absolutely white paper will have 100 per cent contrast. Dull-finished black beads on a black gown or similar white beads on a white gown might represent nearly the other extreme, the beads being seen only because their contour is indicated by more or less slight shadows, or places of varying brightness. Contrast is somewhat under our control through control of illumination in certain cases.

Time is a condition in seeing which hardly needs discussion as an element; it has been demonstrated so often by the so-called "speed of vision" devices and tests that it generally is recognized.

As previously noted, brightness is the one fundamental variables which is within our control. Given any combination of size, contrast and time factors, seeing will become more accurate and more satisfactory with increasing brightnesses. This will result directly from increasing intensities of illumination, where reflection factors are fixed. Given undesirable conditions as regards size, contrast, or unavailable time, and a greater brightness will aid in overcoming the deficiency.

Further important factors in seeing are glare, both direct and reflected, the lighting of surroundings, vibrations and

frequent changes in intensities as found in looking from place to place on a desk which is lighted solely or largely by a desk lamp.

The benefits of improved seeing conditions in offices, schools and factories result in increased production. Such benefits are the direct results of increased speed and accuracy of seeing, although the ability of a tool to remain sharp certainly affects its productiveness and there is no reason why eyesight conservation should not also be helpful in the same manner as well as from a humanitarian standpoint. Even in the home, the same benefits result from the same causes and should be given serious consideration along with such matters as general comfort and appearance.

Good Lighting for the Small Plant—

Maintains efficiency of workers.
Increases production.
Improves quality of product.
Reduces spoilage.
Improves morale.
Decreases labor turnover.
Eliminates accident hazard.
Promotes cleanliness.

The value of good lighting for the plant is analogous to that for the office. Increased human efficiency resulting from improved seeing conditions means better quality products, less spoilage and an increase in the unit output per worker. Reduction of the accident hazard, improvement of morale and decreased labor turnover all can be traced directly to good lighting.

The greater the demands upon the visual sense, the greater the need for good lighting. The machinist, auto mechanic, type setter, tailor and laundryman all depend upon speed of vision to accomplish their tasks with a minimum of effort and a minimum of error.

The greatest hazard in industry today, from the lighting standpoint, is bare lamps. These glaring light sources, besides wasting light, are the direct cause for at least 15 per cent of all industrial accidents. If the money lost through these accidents could be used to purchase good lighting, the future economic loss of accident due to poor lighting would soon be reduced to a minimum.

Good Lighting for Service Stations, Etc.—

Eliminates competition with poorly-lighted station.
Advertises cleanliness.
More inviting to passing motorist—can see driveways.
Property value increased.
Increases business.

If the independent service station, roadside stand, market, etc. are to remain in business, they must have good lighting as competition in this field is increasing each year.

Here again the speed of vision plays an all-important part, for unless the lighting is of sufficient intensity, the motorist will pass by without as much as noticing the station or market.

Floodlighting, properly controlled, supplemented with auxiliary lighting, produces an effect that is pleasing to behold and yet has the desired stopping power because the object can be seen for some distance down the highway.

SUMMARY

Know illumination design and sell your prospect on the value of good lighting. Don't tell him he can get along with fewer outlets than you know he needs. Don't encourage poor wiring just to get the bid. These things reflect upon your integrity and always cost you money. Always remember there is another day coming; sell for tomorrow's needs as well as today's, for a lighted community means more business for the individual than isolated displays here and there surrounded by general darkness.

BIBLIOGRAPHY

For those caring to delve further into the field of illumination design the following sources are recommended as the most practical:

Illuminating Engineering Society, "Transactions."
Illuminating Engineering Society, "Lighting Data Sheets." These are actual solutions of lighting problems.
Lamp Manufacturers' "Lighting Publications."
Lamp Manufacturers' "Lighting Magazines."
Lamp Manufacturers' "Illumination Courses."
Fixture Manufacturers' "Lighting Catalogs."
Fixture Manufacturers' "Illumination Courses."

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(NOTE—Appended as a supplement to this report are data pertaining to wiring and lighting, along with standard paragraphs for specifications. Also appended as a part of the complete report of the committee is a report on street and highway lighting.)

Suggested Tables and Data for Use in Designing a Wiring Plan and Lighting Installation

Data to get about the building to be wired and lighted:

1. Color and condition of finish of: walls, ceiling, wall cases, counters, show cases, display tables, desks, and so on.
2. Draw rough floor plan showing dimensions and ceiling height. Locate on this plan: All obstructions, supporting columns, wall cases, counters, show cases, display tables, desks, work benches, machines, skylights, and so on.

Preparation of wiring plan and lighting installation:

1. Draw floor plan to scale and locate all obstructions, supporting columns, skylights, fixtures, and so on.
2. Locate ceiling outlets according to paragraph 1, Additional Requirements Table.
3. Locate convenience outlets according to paragraph 2, Additional Requirements Table.
4. Locate power outlets and other special outlets where needed. Mark clearly the outlet capacity, voltage and phase.
5. Determine total wiring capacity for overhead lighting load by multiplying floor area by watts per square foot as given in the Wiring Standard Table for the type of interior in question.
6. Determine capacity per outlet by dividing total wiring capacity for overhead lighting by total number of outlets.
7. Determine number of overhead circuits using paragraph 3, Additional Requirements, as basis for circuit load.
8. Determine circuit wire size using paragraph 4, Additional Requirements, as basis for minimum circuit wire size.
9. Locate panelboard according to conditions of paragraph 5, Additional Requirements.
10. Determine size of service and feeders by taking for total load the total of the overhead lighting load plus convenience outlet load plus the motor load plus all other known loads.
11. Select proper foot-candle intensity to recommend for this interior from table of lighting intensity standards.
12. Select type of lighting system best adapted to the interior in question.
13. Determine proper lamp size by referring to table of watts per square foot for type of lighting fixture to be used, being certain the ceiling and wall reflection factor and room dimensions are properly used in selecting the multiplier. Area per outlet times multiplier gives the lamp size per outlet.
14. Make a set of specifications to accompany the wiring plan and bid so your customer will know what he is getting. Use the paragraph provided for this purpose.

SPECIFICATION PARAGRAPHS

Scope of Work

We hereby agree to furnish and install all equipment needed and usually furnished in connection with such system to make it complete in every respect, whether specifically mentioned or not, unless specifically excepted, for (a), (b), (c), etc.

(a) Electric light and power system
(b) Public telephone system
(c) Interphone system
(d) Call bell system
(e) Fire alarm system
(f) Radio system

Code Requirements

All work done and all materials used will in all ways be in accordance with the rules of the Board of Fire Underwriters, the city ordinance and the local utility company.

WIRING STANDARDS FOR INDUSTRIAL STRUCTURES

(Not Commercial, Residential, Church or Theater)

	Watts per Sq. Ft.
Aisles, corridors, halls, passageways	1
Storage space, warehouses	1
Shipping and receiving rooms	1½
Stairways	100 watts each
Toilets and washrooms	1
Rough Work—Rough assembling	1½
Clay products and cement mills	1½
Coal breaking, screening and washing	1½
Dairy products	1½
Foundry (except fine moulding and core making)	1½
Laundry	1½
Milling (cereals)	1½
Paint manufacturing	1½
Paper manufacturing	1½
Saw mills	1½
Soap manufacturing	1½
Steel and iron mills	1½
Stone crushing	1½
Medium Work—Automobile manufacturing or repairing	3
Bakery	3
Canning and preserving	3
Forge shops	3
Meat packing	3
Paper box manufacturing	3
Printing	3
Textile mills	3
Woodworking	3
Office work	3
Fine work—Bench work, drafting, lathe work, etc.	5
Extra Fine Work—Watch repairing, etc; special design; min.	5

Note: See also "Additional Requirements for Commercial and Industrial Structures."

WIRING STANDARDS FOR COMMERCIAL STRUCTURES

(Not Industrial, Residence, Church or Theater)

	Watts per Sq. Ft.
All commercial buildings (except below)	3
Basements	1
Corridors, halls, passageways (except schools)	1
Exits and/or fire escapes	50 watts each
Banks—General illumination, private offices	3
Cage illumination in addition to general	4
Garages—Display floor	3
Aisles, ramps and storage space	1
Wash racks	1,500 watts each
Hotels—Entrance and lobby	3
Dining and ball rooms, writing rooms	2
Guest rooms with 2 convenience outlets	1½
Guest rooms with 3 convenience outlets	1
Hospitals—Wards or private rooms	1½
Laboratories, instrument sterilization rooms	5
Operating rooms, special design, minimum	10
Office Buildings—Entrance, special design, minimum	3
Waiting and reception rooms	3
Offices	3
Drafting rooms	5
Schools—Corridors, halls and stairs	2
Class rooms	3
Art, drawing, drafting and sewing rooms	5
Stores—General illumination	3
Display windows	200 watts per ft.
Spots and floods (one each 10 ft. of glass)	300 watts each
Show and wall cases	50 watts per ft.
Signs, minimum	1,500 watts each
Stairways (except schools)	100 watts each
Toilets and washrooms	1

Note: See also "Additional Requirements for Commercial and Industrial Structures."

Guarantee

All defects in the work done that develop during the installation or within one year from date of acceptance will be satisfactorily repaired at our expense.

Cleaning Up

Debris caused by our work will be cleared away at all times and we will work in such a manner as not to interfere with other work in progress.

Alternates and Extras

Any additional outlets or wiring required, any change in location of wiring due to changes in construction after wiring is partially or completely installed, or any outlet removed from the plans, shall be agreed to in writing and also contain the stipulated increase or deduction in the contract price for the authorized change.

Cutting

All cutting of walls, floors and ceilings will be done in a workmanlike manner and repaired in a similar manner.

Service

The service will be (a) ..... wire, (b) ..... volts, (c) .....

(a) 2, 3, 4
(b) 120; 120/240; 120/208; 440
(c) Single phase, 60 cycle, alternating current
Three phase, 60 cycle, alternating current
Direct current.

Service Conductors

The service conductors will consist of (a) ....., (b) No..... B & S gage wires run (c) ..... from (d) ..... to serve as entrance as shown on the plan.

(a) 2, 3, 4
(b) Wire size B & S gage
(c) Overhead; underground; pole under ground
(d) Power company's pole, adjacent building, man hole or distribution vault

ADDITIONAL REQUIREMENTS FOR COMMERCIAL AND INDUSTRIAL STRUCTURES

1. Outlet Spacing:
   A. Spacing between outlets and hanger length
   (Distance from ceiling line to bottom edge of fixture socket)

Ceiling Height	Desirable Outlet Spacing	Desirable Spacing from Wall	Desirable Hanger Length	Maximum Outlet Spacing	Maximum Spacing from Wall	Maximum Hanger Length
Ft.	Ft.	Ft.-In.	Ft.-In.	Ft.-In.	Ft.-In.	Ft.-In.
8	9	2–8	0–6	10–0	4–0	0–6
9	9	3–0	0–6	11–3	4–6	0–6
10	10	3–4	0–6	12–6	5–0	0–6
11	11	3–8	0–6	13–9	5–6	1–0
12	12	4–0	1–0	15–0	6–0	2–0
13	13	4–4	1–6	16–3	6–6	3–0
14	14	4–8	2–0	17–6	7–0	3–0
15	15	5–0	2–6	18–9	7–6	4–0
16	16	5–4	3–0	20–0	8–0	4–0
17	17	5–8	3–0	21–3	8–6	4–0
18	18	6–0	3–0	22–6	9–0	5–0
19	19	6–4	3–0	23–9	9–6	5–0
20	20	6–8	3–0	25–0	10–0	6–0
21	21	7–0	4–0	26–3	10–6	6–0
22	22	7–4	4–0	27–6	11–0	7–0
23	23	7–8	4–0	28–9	11–6	7–0
24	24	8–0	4–0	30–0	12–0	7–0
25	25	8–4	4–0	31–3	12–6	7–0
26	26	8–8	4–0	32–6	13–0	7–0
27	27	9–0	4–0	33–9	13–6	7–0
28	28	9–4	4–0	35–0	14–0	8–0
29	29	9–8	4–0	36–3	14–6	8–0
30	30	10–0	5–0	37–6	15–0	8–0

   B. 20 ft. in corridors, halls and passageways.
   C. 225 sq. ft. of floor space (except 18-ft. ceilings).
   D. 20 ft. bay when ceiling height is 18 ft. or more.

2. Convenience Outlets:
   A. Not more than 8 per circuit.
   B. Not more than 3 per circuit when installed for show and wall cases.
   C. 4 for first 400 sq. ft. of office space and
   1 for each additional 400 sq. ft. of floor area.
   D. 1 per column in stores having supporting columns or
   1 per 400 sq. ft. of floor area.
   E. 1 for each 10 lin. ft. of display window glass.
   F. 1 for each 10 lin. ft. of work bench.
   G. 1 per 200 sq. ft. where portable tools will be used.
   H. 1 per 600 sq. ft. of manufacturing area.
   I. 1 per 1,200 sq. ft. of storage space.
3. Watts per circuit, 1,000 (except signs and washracks).
4. Wire—No. 12 minimum, 50 ft. or less, No. 10, all over 50 ft. (except stairs, exits and fire escapes).
5. Panelboards shall be so located that no circuit run will exceed 100 ft. from panelboard to first outlet. Where runs exceeding 100 ft. from panelboard to first outlet cannot be avoided, the initial load shall be limited to 600 watts.
6. Voltage drop not to exceed a 2 per cent total in services, feeders and circuits with full load on.
7. Demand Factors:

	Per Cent
A. All commercial buildings—First 10,000 sq. ft.	100
Excess 10,000 sq. ft.	70
B. Hotels—First 10,000 sq. ft.	100
Next 40,000 sq. ft.	80
Excess 50,000 sq. ft.	70
C. Hospitals—First 25,000 sq. ft.	100
Excess 25,000 sq. ft.	70
D. Schools—First 10,000 sq. ft.	100
Excess 10,000 sq. ft.	50
E. All industrial buildings—First 10,000 sq. ft.	100
Excess 10,000 sq. ft.	70

Service Entrance

The service from the point of entrance to the building to the main service switch will be (a) ....., (b) No..... wires in (c) ..... rigid conduit.

(a) 2, 3, 4
(b) Size of wire B & S gage
(c) Size of conduit in inches

Main Service Switch

The main service switch will be a (a) ..... pole, (b) ..... neutral externally-operated safety switch of the (c) ..... mounting type and of (d) ..... ampere (e) ..... volt capacity.

(a) Two; three
(b) Solid; fused
(c) Flush; surface
(d) Ampere capacity
(e) 120; 120/240; 240; 120/208; 440

Wiring System

The system of wiring will be (a) ..... wire, (b) ..... volt, (c) ..... phase with (d) ..... neutral.

(a) 2, 3, 4
(b) 120; 120/240; 240; 120/208
(c) Single; three
(d) Solid; fused

All wiring will be done in (a) ..... and in general will be concealed. Exposed wiring will be supported and protected by approved means.

(a) Galvanized iron conduit; rust-proof conduit; thin-walled conduit; flexible armored cable.

All lighting outlets will be equipped with 4-in. outlet boxes not less than 1½ in. deep. All local switches will be equipped with standard switch boxes, and where more than one switch is located at the same point, gang boxes will be used.

All outlet boxes, lock nuts, straps, and fittings will be galvanized, cadium plated or otherwise rust-proofed.

No wire smaller than No. 12 B & S gage will be used on this job and all wire will be rubber-covered of a quality conforming to the latest requirements of the N. E. C. for rubber-covered wire.

Distribution and Panels

The main distribution panel will be a (a) ..... (b) ..... mounting type installed at the location as shown on the plan.

LIGHTING INTENSITY STANDARDS FOR COMMERCIAL INTERIORS
(Not Industrial, Residence, Church or Theater)

	Foot Candles
All commercial interiors (except below)	8–15
Basements, corridors, halls, passageways (except schools), stairways, toilets and washrooms	1–4
Hospital wards and private rooms, hotel guest rooms	2–6
Auditoriums, dance halls, hotel dining rooms, railway and bus stations, reception and waiting rooms, school corridors and stairs	4–10
Banks—Cage illumination	12–25
Offices, school class rooms	12–25
Drafting rooms, hospital laboratories, school art, drawing, drafting and sewing rooms	25–50
Display windows	50–100
Hospital operating rooms	100 up

LIGHTING INTENSITY STANDARDS FOR INDUSTRIAL INTERIORS

Corridors, passageways, stairways, toilets and washrooms	1–4
Storage areas and warehouses	2–6
Rough work	4–10
Medium work	8–15
Office work	12–25
Fine work, drafting, bench work, etc.	25–50
Extra fine work, watch repairing, bench and machine work	50–100
Special work requiring extremely close visual application	100 up

WATTS PER SQUARE FOOT REQUIRED TO OBTAIN VARIOUS LIGHTING INTENSITIES WITH DIRECT LIGHTING FIXTURES

Feet						
Room width	9 to 12½	13 to 18½	19 to 26½	27 to 39½	40 to 55½	56 to 90
Room length	10 to 14	14 to 30	30 to 42	30 to 60	40 to 90	60 to 100
Ceiling	10 to 13½	12 to 16½	14 to 20	14 to 20	14 to 24	17 to 24

Coefficient of Reflection												
Ceiling	70%	50%	70%	50%	70%	50%	70%	50%	70%	50%	70%	50%
Walls	50%	30%	50%	30%	50%	30%	50%	30%	50%	30%	50%	30%
Watts Per Sq. Ft.												
Halls, etc. (1)	0.68	0.74	0.60	0.66	0.53	0.59	0.48	0.55	0.44	0.40	0.40	0.45
Cafes, etc. (2)	1.46	1.57	1.26	1.40	1.12	1.27	1.03	1.15	0.94	1.04	0.86	0.96
Stores (3)	2.74	2.96	2.40	2.63	2.11	2.38	1.93	2.16	1.76	1.95	1.60	1.81
Offices (4)	5.10	5.50	4.45	4.91	3.96	4.45	3.62	4.04	3.30	3.65	3.05	3.40

Foot-candle intensities: (1) 2, (2) 5, (3) 10, (4) 20.

WATTS PER SQUARE FOOT REQUIRED TO OBTAIN VARIOUS LIGHTING INTENSITIES WITH INDIRECT LIGHTING FIXTURES

Feet				
Room width	9 to 12½	13 to 18½	19 to 26½	27 to 39½
Room length	10 to 14	14 to 29	20 to 30	30 to 42
Ceiling	9 to 9½	10 to 11½	10 to 13½	12 to 16½
Coefficient of Reflection				
Ceiling	70%	70%	70%	70%
Walls	50%	50%	50%	50%
Watts Per Sq. Ft.				
Cafes, etc. (1)	1.82	1.68	1.52	1.34
Stores (2)	3.18	2.95	2.65	2.35
Offices (3)	6.35	5.80	5.34	4.72

Foot-candle intensities: (1) 5, (2) 10, (3) 20.

WATTS PER SQUARE FOOT REQUIRED TO OBTAIN VARIOUS LIGHTING INTENSITIES WITH INDUSTRIAL LIGHTING FIXTURES
(Base on R.L.M. Dome)

Feet						
Room width	9 to 12½	13 to 18½	19 to 26½	27 to 39½	40 to 55½	56 to 20
Room length	10 to 14	14 to 30	30 to 42	30 to 60	40 to 90	60 to 100
Ceiling	10 to 13½	12 to 16½	14 to 20	14 to 20	14 to 24	17 to 24
Coefficient of Reflection						
Ceiling	50%	50%	50%	50%	50%	50%
Walls	30%	30%	30%	30%	30%	30%
Watts Per Sq. Ft.						
Foot Candles—						
1	0.33	0.30	0.28	0.26	0.24	0.22
2	0.57	0.52	0.47	0.44	0.41	0.38
5	1.19	1.07	0.97	0.92	0.84	0.78
10	2.11	1.89	1.72	1.64	1.50	1.37
20	3.91	3.52	3.20	3.05	2.79	2.54

(a) (Describe panelboard)
(b) Flush; surface

Panels will consist of the following circuit arrangements: (a) .....
(a) List all circuits

In addition to the above arrangements there will be one spare circuit for every five active circuits.

Feeders

All feeder wires are run as follows:

1. (a) .... (b) No..... wires in (c) .... inch conduit from (d) ..... to (e) .....
2. .....
3. .....
(a) Number of conductors
(b) Size of wire B & S gage
(c) Size of conduit
(d & e) Location of feeder

NOTE: Repeat for each feeder.

Branch Circuits

Branch circuits are arranged so the load that will be installed initially will not exceed 1,000 watts.

No convenience outlets will be placed on any circuit supplying lighting outlets.

Wiring Devices

Switches—The location of all door swings as shown on the plan is tentative only and will be checked in the field as construction progresses and switches installed accordingly. All local switches will be 20-amp. flush tumbler and of a type designed to operate the Type C lamp loads. All switches will be installed 4 ft. above the finished floor line.

Convenience outlets—All convenience outlets will be of the duplex type and installed 18 in. above the finished floor line.

Lighting Equipment

The following lighting equipment will be furnished and installed.

Power Equipment

The following listed power equipment will be (a) ..... and installed.
(a) Furnished
(Tabulate equipment)

Conclusion

The customary light and bell test for shorts and grounds on all circuits will be made as soon as they are pulled in and before plastering or other finishing work is completed.

COEFFICIENT OF REFLECTION OF COLORED SURFACES

Tints	Per Cent		Per Cent
Gloss white	84	Buff	55
Flat white	82	Light blue	54
Eggshell white	80	Shell pink	49
Ivory white	79	Pink	49
Silver gray	75	Bright sage	48
Cream	74	Light tan	48
Pearl Gray	74	Medium blue	43
Pink	72	Buff stone	42
Ivory	71	Pale azure	38
Primrose	70	Sky blue	35
Lichen gray	69	Medium tan	35
Ivory tan	67	Olive green	20
Light green	63	Forest green	18
Satin green	61	Cardinal red	18
Light gray	58	Cocoanut brown	15
Wood Finishes			
Light oak	34	Mahogany	8
Dark oak	13	Walnut	7
Very light	70 to 85	Fairly light	40 to 60
Light	60 to 70	Fairly dark	20 to 40
		Very dark	1 to 20

*Street and Highway Lighting**

STREET LIGHTING

The enormous darkening of street lighting units in the cities of the Northwest during the last year or two leads to the conclusion that the public has hitherto accepted street lighting with little appreciation of its value and with no knowledge of the enormous economic losses due to night accidents and crimes which are directly related to inadequate illumination.

There is evidence also that the public utilities have shared this lack of appreciation and understanding. The darkened condition of the street further indicates that they have not done as good a job in selling electric street lighting values to the public as they have in selling the values of electricity in home use. It is a safe statement that devices with known essential values are used in times of financial stress as well as in good times.

It is our purpose therefore in this report to point out:

First, that when there is inadequate illumination on the streets, the "safety and convenience" of the public is endangered, resulting in an enormous economic loss far in excess of that saved by the reduction of street lighting expenditures.

The Travelers Insurance Co. found out by a nation-wide study in 46 cities during 1931-32 that as vision was hampered or restricted by inadequate illumination, automobile accidents increased. The study was made of accidents occurring during the hours of 5 to 8 p. m.—the period of greatest

*A report of the commercial and industrial lighting committee.

traffic activity during the day in both summer and winter months. Making an allowance for an increase in the winter months due to seasonal and road conditions, the fatal and non-fatal accidents were twice as great during the winter hours when some form of artificial illumination was necessary as compared to the summer hours when the perfect lighting of nature prevailed.

Based on property and personal injury premiums paid on insured cars, extended to all registered cars, plus the value of lives lost, based on life expectancy, The Travelers Insurance Co. estimates that the average economic loss per accident is $3,000.

In the 18 months of the World War, the total killed and wounded in the American Army was only 233,184. In the 18 months ending December 31, 1931, there were 1,630,490 killed and injured by automobiles in the United States. Taking above percentages of casualties traceable partly or wholly to hampered vision, an average of $3,000 per accident, and reducing same to a 12-month period, we find a $1⅔ billions economic loss per year attributable to inadequate street illumination. In another way, poor vision as the result of inadequate street illumination is costing the American people more per year than the soldiers' bonus or disability allowances.

The president of the National Surety Co. estimates the annual cost to this country of burglary and theft to be $250,000,000. Based on studies of crimes of the above nature committed in Cleveland before and after the installation of improved street lighting, it was estimated that such an improvement resulted in the reduction of these crimes by 30 per cent. Applying this percentage to our annual loss from burglary, we find an annual economic loss of $75,000,000 attributed to inadequate street lighting.

Inadequate street illumination is costing the public of the United States annually $1,741,000,000, or $15 per capita. According to the latest and best figures available, the total expenditures per year for street lighting is $85,000,000, or an average of $0.705 per capita. (1932 expenditures would no doubt be less.) If by doubling the above expenditures—bringing it to $170,000,000 per year—we could cut the economic loss of $1,741,000,000 by only 25 per cent, the public would have a net gain of $265,000,000. This offers a self-liquidating project which would help materially in the return of normal times.

In the words of R. E. Simpson, engineer with The Travelers Insurance Co., "Seldom indeed does an opportunity present itself for a community to spend a given sum of money with so great a prospect of handsome returns, as can be brought about by providing adequate street lighting."

While the losses referred to can be measured in dollars and cents, the amount of grief, suffering and sacrifice occasioned by automobile accidents cannot be measured. It is safe to say, when brought home individually, that there is no one who would stop at an outlay within his means, if by so doing he could prevent the death or injury of a loved one. The terrible facts are that the amount of grief, suffering and sacrifice attendant upon automobile accidents is comparable only to that brought about by modern warfare and its aftermath.

To this individual anguish and suffering, The Travelers Insurance Co. states that in the 46 cities included in their survey, it was found necessary to add an annual cost per person of $1.55 on account of automobile accidents.

The committee on municipal street lighting of the International Association of Municipal Electricians reported to their annual convention in St. Louis last August as follows:

"Many municipalities in these times of limited tax returns and mounting expenditures have reviewed their budgets with a view to reducing the cost of street lighting service by reducing the quantity or size of the lamps.

"Few cities have a standard of street illumination sufficiently high to permit of any reduction in this essential service and the gross saving thus effected may very well turn out to be a net loss to the community, due to the economic losses resulting from increased accidents and crime during the hours of darkness."

Second, it is still true that street lighting enhances the community value of the street and increases its attractiveness.

The enhancement of "the community value of the street" by improved street lighting is indicated by the decided increase in the number of persons using the street after such improvement. One survey showed an increase of over 25 per cent. On a certain street in a western city, a number of merchants had intended to move when their leases expired. A new street lighting system was installed and the merchants renewed their leases. A street lighting system, therefore, tends to stabilize the character of the neighborhood and is a valuable contribution to the community as a whole, because any deterioration in the character of a district is detrimental to the entire municipality.

The aesthetic phase of street lighting is not readily evaluated, but it is in keeping with the "city beautiful" idea, which would not have spread throughout the country as it has if it did not possess a definite value. Experience has shown that improved street lighting stimulates the storekeeper's business by attracting night window shoppers. "Tonight's window shopper becomes tomorrow's customer."

If the improvement of a street by a street lighting system enhances its community value and increases its attractiveness, certainly the retention of street lighting maintains these values. Mayor McKee, of New York, in rejecting the suggestion of the Citizens' Budget Committee for the darkening of street lighting, in order to save money, said: "This city is not going to have the appearance of being run down at the heels."

Third, a study of municipal expenditures reveals that the vast majority of cities have not increased their expenditures for street lighting in the same proportion as other expenditures, nor have they reduced their expenditures in equitable proportions.

The latest available statistics show the following municipal expenditures:

	Per Cent
Schools	38.0
Protection	19.6
General government	8.6
Sanitation	7.2
Charities, hospitals, corrections	7.0
Highways	5.8
Miscellaneous and general	5.1
Recreation	3.6
STREET LIGHTING	2.6
Health conservation	2.5

These statistics also show that during the past 20 years there has been a very slight increase in street lighting appropriations as compared with other municipal expenditures, in spite of the fact that during this period (1910 to 1930) the passenger car registration increased from 460,000 to 23,000,000. These figures do not take into consideration the large number of trucks, about 3,000,000 altogether, using the streets in 1930, as compared to practically none in 1910. In other words, we have an increase in traffic conditions of over 5,000 per cent, with little increase in street lighting, which is a vital part of traffic safety.

The Bureau of Census shows that in the cities of this country of populations of 30,000 and over, starting with 1911 and ending with 1928, the per capita expenditures for street lighting increased only 50 per cent, while per capita expenditures for protection (police, fire, etc.) increased 104 per cent; for charities, hospitals and correction, 131 per cent; for health and sanitation, 139 per cent; and for schools and libraries, 212 per cent.

Adequate street lighting assists the police and fire departments in the performance of their functions.

Fourth, it may be that the enormous reduction in street lighting units has a close tie-in with rates charged for street lighting purposes. This certainly is a point worth studying in order to be certain that no just blame for the reduction of street lighting lies at the door of rates charged.

Knowing that the investment in utilitarian lighting is in a large measure in the overhead feeder wires and fixtures regardless of the lamp size, your committee suggests that this might be a very advantageous time to give more honest and thorough study to the matter of rates with a view to giving a greater amount of illumination for the money expended.

Fifth, that very little definite and organized means have been used by the public utilities to counteract the reduction of street lighting and to bring home to the municipalities and the public generally the inherent values and economic savings afforded by adequate street lighting. The committee

suggests that a definite program be set up for disseminating this information and data generally.

The following are some pertinent facts which could be well amplified in educational promotion:

"Even in ancient days, LIGHT was man's greatest protector."

"Four-fifths of all traffic is in the daytime, one-fifth at night, yet one-half of all fatal accidents occur after sunset."

"Two and one-half billion dollars lost through traffic accidents in 1930."

"LIGHT drives death from city streets."

"Each one dollar invested in street lighting will save $2.75 in accident and crime cost."

"Available figures credit a 30 per cent to 40 per cent decrease in crime through adequate street lighting."

"Insurance rates are fixed by actual experience; it then follows that the curtailment of actual existing street lighting, practiced for even a brief period, will increase insurance rates (particularly those concerning automobile accidents) beyond any possible saving."

The purpose and value of street lighting was recognized many years ago, as evidenced by the following quotation from the records of the proceedings of a meeting of the Common Council of the City of New York, held on November 23, 1697:

"This board taking into Consideration the great Inconveniency that attends this Citty being A trading place for want of having lights in the Darke time of Ye moon in the winter season itt is therefore Ordered that all and Every of the house Keepers within this Citty Shall put out lights in their Windows fronting Ye Respective Streets of the Said Citty According to such manner and Rule, as Shall be Directed by the Mayor two Aldermen and two Assistants under the Penalty of Nine pence each Night for Every Default.

"Ordered that the Mayor Call to his Assistance any two of Ye Alderman and two Assistants for Ye making the said Regulation and that they Also be a Committee to Audite the Accts of Ye Respective Collectors of the Taxes Paid by this Citty."

HIGHWAY LIGHTING

Your committee desires to reiterate that which has been said in committee reports to this Section for the last five years, to wit: That a definite move be launched looking toward the enactment in the state legislatures of some legal means by which the improvement of highways by lighting systems can be financed and maintained.

During the past year there have been a large number of accidents on the highways due to improper lighting (blinding headlights) and at dangerous and blind crossings.

At least, as the first move, a legal means should be provided so that congested highways between the larger cities and the heavily-traveled farm-to-market roads be improved by street lighting systems, and their maintenance legally provided for; and that a legal means be provided for the lighting of dangerous crossings, curves and localities, the installation cost and maintenance of which cannot rightfully be allocated to any one community.

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*Commercial Cooking**

DURING 1932 the commercial cooking field has been affected much the same as all other lines of merchandising. It is quite apparent that either through a disinclination to spend money by those who have it, owing to the general hysteria of the times, or to the inability of others to make capital outlays, due to meager business, equipment in a majority of places is becoming either obsolete or depreciated to such an extent that new equipment must soon replace that now in use.

With a faith in our future and a return of but a short distance on the road to normalcy, buying in the commercial cooking field must show marked improvement to replace the natural wear and tear of the past few years. With better times, new places will be opened to fill the voids caused by those who have fallen by the wayside, and proprietors of these newer places will be optimistic enough to listen to those selling better equipment.

With the return of beer and possibly light wines and an evident determination to confine the sale as much as possible to establishments purveying food, it is only fair to assume that the demand for some of the so-called pantry devices will be brisk during the balance of the year.

We must realize that during the past few years manufacturers of various cooking devices have not been asleep, with the result that great improvements have been made in both gas-and oil-burning units. These improvements in insulation, controlled heat and economy have invaded the field long held supreme by electricity.

Keen competition in the food purveying business in many cases has caused owners to search for other and cheaper fuels. In the attempt to achieve this result, valuable equipment in some cases has been scrapped and a capital outlay made to change to other cooking apparatus which, on paper, shows savings. This equipment may take several years to pay for in the smaller establishments. The convenience, cleanliness and uniformity of electrical energy is lost sight of or at least does not seem to receive the consideration it deserves. This is a point to be stressed and in some cases will be a controlling factor in the selection of fuels. Possibly the fault is partly ours in not presenting our facts as forcibly as they deserve.

Commercial cooking establishments are as a rule desirable loads. The heavy work in restaurants and hotels is done largely during the morning hours and up to 2 p. m. There is, of course, considerable activity from 5 to 8 p. m., but the bulk of the day's work is before the late afternoon peak. This applies as well to our hospitals, and the average bake shop with its maximum demand between midnight and 6 a. m. is most desirable. This fact as well as the competitive fuel situation has been taken into consideration in rate making, and, as a rule, throughout the territory rates for electrical energy are quite competitive.

We must realize that the continuous agitation by certain political groups, mercantile groups and others regarding rates and alleged practices of public service corporations has set up in many cases an unconscious resistance in many minds, even if figures and experience prove otherwise.

How to overcome these ideas as to rates and performance of equipment, how to increase sales of electrical equipment as against the latest equipment in other fuels, and how to keep it on the lines when sold against competitive onslaughts, have been the problems before this committee. With this in mind, we present a report formulated from the ideas of the various members, who have given careful consideration to the matter during the past three months.

Load building in commercial cooking establishments can be divided into two branches: (1) counter and pantry appliances, into which fall the smaller units such as waffle bakers, toasters, griddles, counter fry kettles, egg boilers, Silex stoves, roll warmers, coffee urns and numerous other items; and (2) heavy-duty group, which includes bake ovens, ranges, deep fat fryers, heavy griddles, broilers and other items.

Many of the pantry appliances can be connected to convenient outlets. The appliances are small in size, suited to a minimum of space which the counter or pantry affords. They are fast in cooking as they must produce short orders without delay. It has been found that in busy establishments this counter equipment will average from 1,000 to 1,200 kw.-hr. per kw. of connected load. One of the companies in the Association reports it has found that counter equipment brings a greater return per kilowatt connected than the larger units, the average earning per kilowatt of counter equipment connected being $45 as against $30 for the heavy-duty group.

Pantry work can be done better with electrical equipment than other forms, and further, where placed in sight of the public, is far more attractive than equipment using other fuels. This makes this group easiest to sell and every place from the roadside hot dog stand to the highest class hotel

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*Report of the commercial cooking committee, industrial and commercial sales bureau, Sales Section, P. E. Stowell, Dohrmann Hotel Supply Co., chairman.
Edison General Electric Appliance Co.: H. F. Huggins.
Idaho Power Co.: O. C. Mayer.
Pacific Power & Light Co.: B. P. Baily.
Puget Sound Power & Light Co.: Tom Sawyer.
Utah Power & Light Co.: Geo. Trayner.
The Washington Water Power Co.: Carl Hoffman.

is a potential customer for some piece or pieces of this pantry group.

A prospect survey is a great help and will surprise you when made. Have your representatives tabulate hotels, restaurants, bakeries, roadside stands, country clubs, lunch counters, tea rooms, hospitals, churches, caterers, schools, golf clubs and lodge halls, and you will realize the possibilities. Every one of these places can use some piece of equipment. It is for the energetic salesman to find out what can be used and then present it.

It is highly essential that the salesman know his line, what each piece will do and whether it will fit the job. The hotel and restaurant supply houses fit into the picture at this point. Their salesmen are trained in the proper use and placing of kitchen equipment and the experience of others with the same equipment, and they are always willing to cooperate with the central station in the sale of electrical merchandise.

A user's familiarity with the items covered by the pantry group breaks down prejudice and it is found that the user of this equipment is more easily sold on items in the heavy-duty group, particularly bake ovens and ranges, so it is essential to place the pantry group wherever possible with the idea of breaking in with the larger units later.

The amount of heavy-duty equipment in use in commercial food establishments is not in proportion to the pantry equipment in use, and several members of this committee have stressed the high cost of heavy-duty equipment as compared with installations using other fuels. As one member puts it, "This high capital outlay seems to be a deterrent or stumbling block to the sale of equipment of this kind, and some thought and study should be given to this phase of the matter with the idea of at least securing more liberalized Underwriters' rules, as well as of working out some plan of permitting the customer to pay for his wiring and installation costs on more liberal terms." This, no doubt, is an individual matter to be worked out between the central station and local wiring concerns who cannot finance long-time payments. Speaking generally, if it could be accomplished, lower-priced equipment, without sacrifice of performance or stability, would be desirable especially during these times.

The committee is pleased to report that, despite the times, there has been considerable activity by the various companies in this Association. Three companies report sales of counter and heavy-duty equipment amounting to $35,000, with a connected load of 2,490 kw., and earnings in 1932 of approximately $59,000. We have not had figures from all members.

Where changes of equipment from gas to oil or other fuels have been made, there is a field for the installation of water heaters for steam tables, coffee urns, etc. Two companies report considerable activity along these lines. These heaters as a rule range from 750 to 3,000 watts and one company is placing them in steam tables on a flat water heating rate. Other installations have been made in barber shops, clothes cleaning establishments and in hospitals.

The commercial bakery is a large potential field for heavy equipment, though the fully electrified hotel kitchen runs it a neck-and-neck race. A report from one of our smaller cities in the Northwest shows that the current consumption varies from 135 kw.-hr. to 185 kw.-hr. per 1,000 lb. of baked product, depending on the size of the equipment and how used.

Firms using ovens of the larger sizes, which put out 1,000 pounds or more of bakery goods per day, are well satisfied with unit costs. Where installations are smaller and the daily output materially lower, with a consequent lower monthly consumption, it is hard to keep the cost comparable with other fuels, as the greater portion of the power is being paid for at the higher initial step of the rate.

Frequently this is caused by a unit of too large a capacity being installed. The result in many cases is that the preheating cost is not distributed over several batches of baking, as it would be if a smaller unit were used. One or more decks are empty for considerable periods, due to the inability of the baker to keep up with the oversize oven.

A careful study therefore should be made of the requirements of each prospect, first, to keep the connected load down to actual necessity; second, to sell a unit which will distribute the preheating costs over several bakes; third, to sell a unit no larger than the baker can work at maximum speed.

Our reports also show that few bakers are sold fry kettles. One of these should be an adjunct to every up-to-date bakery and will assist in securing a lower average rate. One baker makes very favorable comments on 12 kw. kettle installed last summer. Extracts are as follows: "Automatic adjustable control makes possible any desired heat, with no possibility of over-heating and consequent burning of compound. Fire hazard is eliminated due to absence of flame and guards prevent overflow. Heavy insulation keeps heat in the kettle, making it cooler than when other fuels are used. More economical because of correctly controlled heat. Puts out fried bakery goods at about 1/3 previous costs."

It seems, therefore, that a campaign should be made on all bake shops with the deep fat fryer as a necessary unit in their equipment.

Little heavy-duty equipment has been sold to hotels, restaurants and hospitals, and this is at present our largest field. There is more sales resistance in this branch of cooking than any other. The old-time chef was bound by many traditions of his calling, and fuel was one of them. However, with the gradual change in eating during the past ten or fifteen years, this type of cook is becoming extinct and a more liberal-minded man is taking his place—a man who is familiar with modern inventions and practices—and your committee suggests that every effort be made to place electrical household cooking equipment in the home of every owner, manager and cook. This equipment should be watched carefully to see that it is used to the best advantage and in the most economical way. This will tend to break down sales resistance. The almost universal use of waffle irons, toasters, etc., in restaurants can be attributed largely to the fact that the proprietor uses them in the home.

One of the companies reports it has been working for several years with boards of education in putting over the electrical idea, with the result that in two high schools there are now large classes teaching cooking to boys. Some of them no doubt eventually will enter the commercial cooking field in some branch and will know the value of electric cooking. Demonstrations of all types of equipment are held in the auditorium of the utility and are attended by these classes.

The merchandising of heavy-duty equipment, it is found, can be achieved best by a cooperative plan with hotel and restaurant and bakery supply houses and, in some cases, local dealers. Some pantry devices should be carried for demonstration purposes and quick delivery. All related interests having to do with sales of this nature should agree with the central station on methods of approach and negotiations, so as to build up a cumulative acceptance of the unusual merit of the appliances considering the benefits as a whole.

Men familiar with commercial cooking should contact the prospect, learn his needs and supply him with information in regards to what electric cooking has to offer. Those men should have three objectives: (1) to gain new load, (2) to hold the load already on the lines and see that it is used efficiently to maximum, and (3) to gain back load which has been lost. Frequently it will be necessary to sell new equipment to replace obsolete or worn out units with which the customer is dissatisfied.

By working in close cooperation with the various supply houses, the following benefits result:

1. The customer receives authoritative explanation of his rates and estimated cost of operation. The advantage of various types of equipment are promoted by the company salesman, thus giving the purchaser the advantage of a selection. Then the representative of the utility should see that salesmen handling the desired equipment get on the job. The customer thus gets the benefit of views expressed by both the utility representative and the supply house representative. These two act as a check on each other and increase the confidence of the prospective purchaser.

2. The salesman is relieved of the responsibility of quoting electric rates while the utility representative can present a better and more convincing story of rates and cost of operation. By this cooperation the utility representative is not handicapped by having to discuss various types of equipment and their relative merits. It must not be construed, however,

that there is any definite line of distinction between the duties of the utility representative and the supply house salesman. They work in cooperation.

RECOMMENDATIONS

It is recommended that in general a program along the following lines be adopted. This already is in use in at least one member utility.

Source of Revenue—

1. Prevention of further decreases due to decreased use of present equipment or to a discontinuance of same.
2. Restoration to use of equipment not now in use, but in customer's possession.
3. Promotion of sales of counter appliances.
4. Promotion of sales not only by the utility, but by hotel restaurant and bakery supply houses.

Promotion Activity—

1. Contact every customer and fill out a customer's data and prospect card; this card to be filed and used in the sales office. Present a survey and report to any customer requesting same who is a prospect for further use of electric service.
2. Mail literature to a selected list of commercial cooking and baking establishments, secured from the data and prospect card.
3. Follow up with calls of utility representatives and supply house salesmen. The reports of a survey given a customer should cover:
   - A. Present cooking and baking equipment in use.
   - B. Condition of equipment.
   - C. Cost of operation, covering total average cost per month or average cost per unit of business.
   - D. Cost per kw.-hr. for any additional use.
   - E. Recommendations.
   - F. Replacement of any present equipment with advantages and savings.
   - G. New additional equipment with advantages and cost of operating based on the use of additional electric current.

Public Relations—

The customer must be given a true understanding of the value and effectiveness of the service he is using. Regular contacts will establish and maintain a personal relationship and create a friendly understanding which will offset misleading propaganda.

Trade Relations—

A customer survey will bring to the electrical trade additional business and thoroughly acquaint the trade with the possibilities which, in turn, will encourage their own activity in the field.

This report is the result of fine cooperation received from the individual members of the committee, which the chairman gratefully acknowledges.

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*Building Load by Selling Industrial Heating**

AT THE beginning of the year, the committee searched over the field of industrial power and industrial electric heating trying to decide on a subject that would be worthy of presentation. We found that past committees have reported on nearly every phase of activity pertaining to the above subjects and that many of these reports have had a decided influence on these fields of endeavor.

After making a careful study of our present-day situation, this committee feels that more time and effort should be given to the problem of selling industrial electric heating. We feel that this is definitely a sales problem and that no hard and fast rules will apply. Our survey has proved conclusively that our customers are interested in industrial electric heating. The problem is, how can we best sell these customers? We believe that the best policy is to study those methods that have produced results in the past and try to adapt them to our present-day problems. It is with this thought in mind that we submit our program for the ensuing year.

Therefore, the purpose of this report is to analyze the problems of promoting the use of electric energy for industrial heating purposes and to give some fundamentals of sales work as applied to this field. We have an abundance of information pertaining to design and construction of furnaces, ovens, melting pots, etc. We also have considerable information on operation costs, applications, data and reports on performance of equipment. We do not have information that can be used as selling data, showing a central station man how to take this material out to a customer and with its aid induce him to buy a piece of electric heating equipment. We hear very little of the specific reason or reasons why a given customer purchased and installed a certain type of electric equipment.

It is our opinion that the majority of central station companies do not consider the selling of electric heat a sales job. We must do more than merely inform our customers that we have competent men in our companies who are available and willing to work out their particular heating problems. Active and continued sales contact is essential if we wish to instill the confidence in the customer that will prompt him to adopt our recommendation. A prospect for electric heat very seldom comes to us except under artificial stimulus, such as direct mail advertising. We must go to the customer's plant and develop that prospect from the ground up.

It has been noted that in the majority of cases the central station sales engineer operates somewhat as check-up man on installations sold by the manufacturer. That is only one of his jobs. His main one is to contact and develop new business. He must contact his own customers and develop the desire on their part for electric heating equipment. Then he can exercise his engineering ability to the greatest degree, knowing that he has the confidence of his prospect.

We realize that the central station does not usually sell industrial heating equipment. It relies on the electrical manufacturer, jobber and retailer to do that, and rightly so, for the equipment manufacturers, jobbers, etc., are more familiar with their equipment than we are. Industrial equipment usually is large, especially designed or built to fit the particular needs of the customer. Therefore, the danger of recommending the wrong type of equipment is great. For that reason, the central stations have left the sale of such equipment in the hands of the manufacturer.

The equipment manufacturers continually are pointing out to the power companies the revenue that can be derived from the installation of heat processing equipment and are urging them to promote heating load. The central stations are willing to assist in such endeavor, but say, "How can we help if we do not have anything to sell?" This committee believes that all central stations can find the solution to this query by observing the methods used by other organizations who sell things without having a concrete article to sell. Many organizations have the same problem and their methods should be of interest to us. Their chief function is to serve as a connecting link between the party who desires to obtain a certain result and the party who has the equipment that would produce the desired result. In other words, they find the market and then put the market in touch with the manufacturer who has the material. Using this same method of successfully promoting the sale of industrial electric heating, we, the sales organization of the central stations, must have a complete knowledge of the consumers on our lines and the type of equipment and processes used by them. We also must have a complete knowledge of the character and proper application of the heating equipment that is sold by the electrical manufacturer. Thus we are able to find our market and we know where to go to obtain the supplies or the equipment to cover the needs of the consumer.

Merely knowing our consumers is not enough if we wish to promote the sale of industrial electric heating. We must have

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*Report of the industrial power committee, industrial and commercial sales bureau, Sales Section, H. B. Batcheldor, Puget Sound Power & Light Co., chairman.
Eastern Oregon Light & Power Co.: O. D. Lanning.
Idaho Power Co.: J. B. McLain.
Mountain States Power Co.: J. B. Cashin.
Northwestern Electric Co.: A. K. Gaylord.
Utah Power & Light Co.: G. B. Walker.
The Washington Water Power Co.: A. K. Wagoner.
Westinghouse Electric & Manufacturing Co.: R. C. Cooper.

a complete knowledge of the consumers' plants and methods if we are to discover new fields for electric heating applications. This information can be obtained only by making complete surveys and continually contacting the consumer. These surveys necessarily must be made by men who have a good knowledge of industrial heating applications and who are able to recognize it as such when they see it. The owners and managers of plants must be cultivated so that we may have their friendship and confidence. This point is absolutely essential for the successful performance of any promotional plan. By these methods we will be able to prepare the way for the reception of the idea of electric heat, cooperate with the manufacturer and be of service to the consumer after the equipment is installed.

It also is essential that we obtain as much information as possible from the various manufacturers of electrical heating equipment, discuss our problems with them and listen attentively to their description of installations that proved satisfactory to the consumer. Competition from other fields is becoming keener each year. We must be on the alert to overcome this encroachment on our business.

The paving of the way for the electrical heating idea in the consumer's mind is a long and slow process. Much work must be done by the industrial heating salesman in surveying and cataloging prospective customers. After prospective users of electric heat have been uncovered, more work is necessary to convert those prospects into actual users. Much effort must be expended in educating those prospects, for a new idea takes root slowly. At this stage, literature showing how others do their heating jobs is sometimes effective. Testimonials from satisfied users also produce good results. Absolute cooperation with the electrical equipment manufacturer now is essential in order that the sale may be consummated. Discussions of the best rate schedule for energy may be considered at this time, keeping in mind that additional load will tend toward lower average rates. After the sale is made our responsibility does not cease. We should endeavor to help the customer and see that he obtains the utmost satisfaction and service from his equipment.

The committee has analyzed many industrial heating installations and this study proves that one of six reasons was responsible for the adoption of electric heat:

1. Where electricity is cheaper than fuel on B. t. u. basis.
2. Where electricity is cheaper on account of labor reduction.
3. Where electricity is cheaper because of lower maintenance.
4. Where electricity is better because of improved product.
5. Where electricity is better because of improved working conditions.
6. Where electricity is better because of decreased fire hazards.

The first three reasons, of course, are purely economical and can be proved by engineering analysis. The other reasons cannot be refuted, for it is a well-known fact that industrial electric heating processes will produce the results as shown on items 4, 5 and 6. Our job is to convince the prospective customer that, even if other fuel costs are lower than electric energy costs, the other five items more than offset the additional cost of electric heat.

The program of this committee for the ensuing year will be to follow aggressively the fundamentals of industrial heating sales work as outlined. This work is to be carried on in the various central station companies of the Northwest by the members of this committee. In so doing we expect to accomplish the following results:

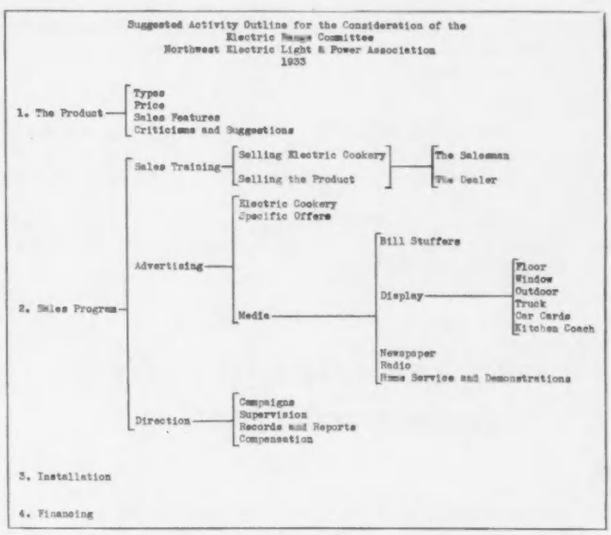
1. Develop the closer cooperation of the equipment manufacturers.
2. Establish the friendliness and confidence of our customers.
3. Build our industrial heating load.
4. Increase our gross revenue.

RESIDENTIAL SALES BUREAU†

*Electric Range**

THE development of the electric range committee's report for 1933 was accomplished through the presentation to each committee member of an activity outline with a request that comments be made concerning the member companies' policies and practices. This outline completely covered all phases of electric range load development and represented what might be termed an ideal activity for the promotion of the electric range business. While the comments received from the members are perhaps not as definite and concrete as might have been secured through the questionnaire method, it was thought that this method would give each committee member an opportunity to exercise initiative in the development of new ideas and to present for the consideration of others the plans and policies which had been successful in his company's promotional work.

The activity outline is reproduced with this report, and divides the discussion into four main subjects: the product, the sales program, installation and financing, with appropriate subheads under each subject.



THE PRODUCT

Type—The majority of the committee favored the buffet-type range, principally because it simplifies inventory and eliminates duplication made necessary by right- and left-hand models. A minority of the committee felt that the console model was still the most popular type and would enjoy good acceptance for some time to come.

Price—The committee was unanimous in its opinion that range prices now are satisfactory, considering that quality features are being incorporated at a price around $150, and that a good quality range minus the deluxe features may be offered for as low as $100.

Sales Features—The warming oven almost unanimously was selected as the first essential sales feature, and practically all of the committee considered it necessary that at least a 16-in. oven and cooker should be included in the ideal range type. Three of the committee thought that the acid-resisting

†R. M. Bleak, Utah Power & Light Co., chairman. Guy E. Davis, Pacific Power & Light Co., vice-chairman.

*Report of the electric range committee, residential sales bureau, Sales Section, Orr E. Crites, Portland General Electric Co., chairman.

Idaho Power Co.: F. M. Ingraham.
Mountain States Power Co.: H. E. Farris.
Northwestern Electric Co.: J. B. Buman.
Pacific Power & Light Co.: Guy E. Davis.
Puget Sound Power & Light Co.: R. W. Clark.
Utah Power & Light Co.: William Moreton.
The Washington Water Power Co.: R. B. McElroy.

enamel should be specified as a sales feature and that temperature control should be a feature of all ranges.

Criticisms and Suggestions—The committee expressed no enthusiasm for colors in combination, feeling that one color finishing satisfies all demands, and that the color should be a light-yellow or a light-green. Some of the committee members noted a trend toward enclosed units and others indicated that speed as a feature has been overestimated; that the trend toward low-temperature cookery has removed the need for selling the idea of great speed. Other suggestions made were that steps should be taken to prevent the chipping of porcelain linings and that a reduction in range parts prices should be made. Only one member of the committee felt that lower prices on ranges incorporating essential features should be brought to the attention of the manufacturers.

THE SALES PROGRAM

Sales Training—The committee agreed that selling the electric cookery idea was the first and most essential consideration and that selling the product would be relatively easy if the first job were well done. They also felt that while the utility salesman has in the past carried the responsibility for selling the electric cookery idea, and should do so in the future, nevertheless definite means should be taken to encourage the dealer and the dealer's salesmen also to assist in doing this work. To this end, the committee feels that monthly demonstration schools should be held and that dealers' sales organizations be urged to attend in order that all outlets may present to prospective purchasers the latest and most effective selling ideas. Cooperative advertising and special campaigns designed to interest the dealer are recommended as a means of making the dealer's activity more effective. The committee also feels that home economics service, as well as maintenance service and installation, plays a necessary and helpful part in promoting future range business.

The committee feels that the sales training should call attention to the fact that individualized selling is a necessity in today's market; that the fact that a certain saturation has been obtained does not mean that the individual is ready and willing to purchase an electric range. Toward this end the committee feels that broader and more visual presentations in the home and in stores should be based on the customer's individual requirements and should stress the actual economies and advantages that will be brought to the prospective purchaser when the installation is made. The electric kitchen coach idea was endorsed as effective both in selling the electric cookery idea and in offering an opportunity to contact individually live prospects who might not otherwise be induced to come to the stores.

Advertising—Electric range advertising may be divided between the electric cookery copy and specific offers relative to the direct sale of merchandise. The committee was equally divided concerning present-day advertising, half of the members feeling that the important thing to do was to interest more people in electric cookery, while the others felt that a sufficient number are sold on electric cookery to be influenced by specific offers where ranges with all the essential features are offered at low prices.

Media—The committee considers bill stuffers as a valuable medium in the presentation of electric cookery. It feels that some effort should be made to use this medium for cooperative work, since dealer antagonism has been developed because this has been used as a direct advertising medium to promote utility sales only. Short, spicy copy, emphasizing no one particular feature of electric cookery, was favored by the committee, and it was thought advisable that this copy be staggered with educational material concerning rates, etc. Newspaper advertising was favored by the committee as being the cheapest and best medium of general advertising, while half of the committee recommended radio advertising as good, particularly for cooperative promotion, and these members suggested that cooking methods and advantages be stressed and recipes be omitted from the continuity.

On display advertising, opinions were divided. Most of the committee favored the idea of combining floor and window displays of an educational nature and alternating them in the window and in the sales room. Outdoor advertising was considered an especially good tie-in medium, particularly if illuminated with neon. Small-sheet truck display advertising was recommended as a very good and inexpensive medium where trucks are available. Cooking demonstrations of the old order were not recommended highly by the committee, the members feeling that the regular cooking schools have lost their originality except, perhaps, in the smaller towns. Demonstrations which present definite superiority of electric cookery were favored by the committee.

Sales Direction—The campaign method of sales promotion was discussed by the committee, and it was the consensus of opinion that year-around activity is more effective, particularly since the dealer-relations problem has eliminated the buy-now incentive, premiums and special-small-down-payments from such campaigns. The necessity for adequate supervision of men in the field was expressed, and the committee approved in a general way the records and reports exhibit which was prepared by the chairman of the committee. Concerning the compensation of sales persons, the committee agreed that this should be based on three considerations: (1) a salary to cover promotional and developmental work required of utility salesmen; (2) a load building bonus, based on the added revenue; and (3) a commission or participation in the merchadise volume, or profit share. Most of the companies represented are compensating their salesmen on flat salaries principally, but most of them have a plan of stimulating activity through a bonus or special compensation based either on quota performance or load-building revenue attained. From figures presented to the committee, it is evident that utility sales persons are developing new prospects who later are sold by dealers, due perhaps to some favorable concession of trade-in allowance, price, etc., and this condition prompts the committee to recommend that salesmen who actually are doing developmental work should be compensated more nearly on a salary basis than has been the practice in the past.

INSTALLATION

The subject of free installation of electric ranges was considered as of no advantage by three members of the committee, while four members of the committee considered it a great stimulant to the introduction of electric cookery, and two members of the committee stressed the fact that it opened the market to tenants who may not otherwise be sold an electric range. One company considered it the best thing of a promotional measure used, and recommended that the campaigns be not regular, but that they should be for specified periods only and not repeated at frequent intervals. Then and then only is a special offer of value in influencing immediate sales. A compromise plan of installation was presented, namely, that wiring up to and including the meter would be furnished by the central station, as a part of its regular service equipment. This plan contemplates that the remaining wiring from the meter to the range be included in the price of the electric range, which would remove additional wiring costs from consideration at the time of purchase. The committee was agreed that the service entrance plan perhaps would be a great stimulant to the promotion of electric cookery at this time, and that the outlay necessary is a financial problem which should be presented to the executives of the various companies.

FINANCING

Concerning time payments, a slight majority of the committee felt that terms from 30 to 36 months were essential to enable us to sell quality ranges, with average buying power as it now is. A minority of the committee felt that 15 to 18 months was sufficient for a range alone, but 30 to 36 months for purchasers of an electric kitchen involving the purchase of two or three appliances at one time. One member of the committee suggested that a payment chart be devised which will eliminate as far as possible the quoting of the carrying and interest charges. Since it is the shrewd purchaser who makes a minute study of the carrying charge, the committee felt that no separate use will be effective; that a plain statement of charges should be made, and that the salesman should sell service rendered in accounting, billing, collection and interest charges.

During the presentation of the committee's report at the

Sales Section meeting in Portland, a demonstration of the advantages of electric cookery was given by means of a visualizer. This consisted of illuminated display equipment on a motor-driven reel, rotating under manual control by the salesman. This equipment aids the salesman in presenting all of the vital points of the superiority of electric cookery, making it easier for him to give a complete and thorough presentation of the subject to his prospective buyer. This is supplemented by a visual demonstration of the cleanliness of electric cookery and a complete explanation of the advantages of low-temperature cookery, particularly with reference to the preservation of the vital food elements, vitamins, mineral salts, etc. The safety, certainty and convenience of electric cookery is stressed in the demonstration, and the value of leisure to do other things is portrayed. Concerning economy, the visualizer shows that time, labor and money may be saved through electric cookery. Testimonials from accredited institutions prove the fact that food shrinkage saving will more than pay the cost of operation of an average range. A compilation of the entire visualizer story will later be made for the purpose of presenting this information to all salesmen, employes and dealers' representatives.

It was the committee's idea that the suggested activity outline, which might be termed an ideal activity, perhaps would not be used in its entirety by any one company, but contains features which might be utilized by several of the member companies.

Further supplementing the presentation of the committee report at the Sales Section meeting, Joseph R. Gerber, of the advertising agency of Gerber & Crossley, Portland, explained a new series of advertising of electric cookery by Portland General Electric Co., in which an attempt is made to dramatize the food value feature of foods properly cooked on an electric range. Also, George W. Madison, of the Portland General Electric Co. sales organization, spoke on the supervision of salesmen and the direction of range selling activities. George E. Kelley of the same company told of the sales strategy he has employed in selling 500 electric ranges in the past five years.

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*Water Heating**

THE efforts of the water heating committee were directed to the merchandising of electric water heating equipment and electric water heating service. The technical phases purposely have been omitted, both for the reason that the National Committee in their report of 1931 covered that subject so thoroughly, with basic technical information of vital importance to utilities now engaged in water heating promotion as well as those who may have it in contemplation, and that the factors which enter into these sales with the probable related subjects are considered next in line of importance. In fairness to the manufacturers of equipment for electric water heating, it is the desire of this committee to leave no reflections in this respect and for that reason no mention is to be made of the manufacturers. Reference is to be made, however, to various types of equipment, for it is felt that these types possess individual characteristics naturally adaptable to certain rate schedules, policies and other requirements.

An outline of features for discussion in this report was submitted to each member of the committee for approval and to finally serve as a guide for their individual discussion. There being no disapproval, the outline was considered a basis for this report. The material as received from the members was quite complete and if included in its entirety would constitute a report of too great length for practical purposes. For that reason, it was decided to extract the more important phases for a brief presentation covering types of equipment and sales methods.

AVAILABLE TYPES OF EQUIPMENT

In view of the various practical means and methods now available for the application of electric heat to heating of water for the domestic supply, and the publicity of the numerous manufacturers now marketing such equipment, it would not seem necessary that these be considered at any length.

It is needless to say that the market is nearly flooded with water heaters, each with an outstanding feature, so that equipment now is available from reliable manufacturers to fill any requirement as to price range, rate schedule, service demands, and performance and sales features.

There are certain definite factors which must be analyzed carefully in order to arrive at a wise decision as to equipment either for a change or adoption. A discussion of these factors, however, is beyond the scope of this committee, though among them for consideration are: present and anticipated load conditions, rate, competition, volume and desired load-building speed. It is felt that upon these factors much depends as to the type of equipment, and this question should be the last for solution. While this is an individual problem for each company because of varying conditions, very essential assistance and information is available in other companies and in the N.E.L.A. reports.

It was hoped to draw out in this report some evidence of a particular type of equipment as having more possibilities than some others under certain rates. It was readily determined that this was a study in itself and a real problem.

The types of equipment featured by various companies would indicate that the storage principal of heating water naturally has general acceptance, and that the clamp-on and insert heating elements are considerable in majority over the circulation or side-arms heaters, particularly in connection with the built-up equipment and separate tank covers. Various combinations of element capacities in all three types of heaters, depending on the type of rate, are in evidence over the territory, and each company is justified in favoring its particular set-up.

Practically all companies in this section have featured the built-up installation; by so doing they have apparently accomplished a volume of sales and a pleasing result in load building which could not have been otherwise accomplished. The complete factory heater has been looked upon as a very high type of equipment and has only entered the picture in a very limited way. Only a comparative few have been sold, and those to a class of customers who ordinarily appreciate and purchase quality equipment.

Built-up installations, it is believed, will continue to carry the volume for some time to come, in view of the present-day prices of the complete heater. The latter, being more of a package article and fitting into ensemble selling, and more readily to a rental place, will become more in favor in the future.

SALES METHODS

A survey of the reports received from the various members of this committee show that there is no plan which may be applied as a sales plan to all companies in this section. Each company has developed a method of its own which is peculiar to that company and answers its sales problems. This would lead one to believe that there is a question as to whether a plan can be developed which can be used universally in all companies. At present, each company feels that it has a method which is workable in its own property and is quite sure that any plan at variance thereto will not produce desired results for that company.

In connection with the carrying out of these methods, it is interesting to note that on one extreme we have the companies who believe in intensive training of specialty salesmen prior to their selling, and on the other extreme the companies who believe that all salesmen with very little training are qualified to sell water heating service. In justice to each, it must be said that the sales plans of these two extremes vary greatly. This, together with the fuel and gas competition which individual companies have to meet, is the reason

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*Report of the water heating committee, residential sales bureau, Sales Section, J. B. McLain, Idaho Power Co., chairman.
Northwestern Electric Co.: J. B. Buman.
Pacific Power & Light Co.: B. A. Hall.
Portland General Electric Co.: Orr E. Crites.
Puget Sound Power & Light Co.: R. M. Clark.
Utah Power & Light Co.: H. M. Ferguson.
The Washington Water Power Co.: R. B. McElroy.

for the diversity of plans used by the various companies. It is evident that the company employing highly-trained specialty salesmen will use different methods of securing business than the company using regular salesmen. However, it is felt that when the public becomes educated to the use of hot water, considerable fuel and gas competition will develop, and your committee feels that at such time the value of well-trained specialty salesmen will be apparent.

Your committee also feels that, even where competition is not pronounced, the future development of the field is dependent upon the satisfaction experienced by the present users. It is evident not only that the proper installation in regard to wattage, size of equipment and type of equipment is important, but also that the location and plumbing arrangement of the water heating installation are factors vital to the continued satisfaction of the customer in his use of electric water heating service.

It also is felt that the promotion of water heating sales does not deal only with the sale of the equipment, but, as illustrated during the last year, it is necessary that customer complaints which may arise after the sale of the installation be satisfactorily taken care of. The water heater salesman must be qualified to go back to these customers and resell them if necessary on electric water heating service by answering any difficulties or objections which may have arisen.

The two following plans have been submitted by members of the committee and illustrate the two extremes previously mentioned. It is true that other plans are in use and are proving workable, but these are the only ones which were presented in detail by committee members, and therefore they have been selected by this committee as typical examples:

1. **The Three Call System**—This system has been recommended because it gives a definite outline for untrained salesmen to follow and permits of proper supervision without handicapping the progress of the sale in any way. The steps of the three call system follow:

1. The salesman approaches the customer and introduces himself as a representative of the local utility, then requests permission to study the customer's present water heating equipment and to make a recommendation on the cost of doing it electrically. The experience with this plan has been that most customers are interested in the comparative cost, especially if it might save something.

The salesmen should investigate all factors relative to the installation, draw a rough sketch, estimate the uses, take measurements, etc. For new men, a questionnaire can be prepared to insure a complete survey.

2. Information obtained in step No. 1 should be taken to the office and complete details of an electric installation worked up, including all wiring and plumbing. In the case of inexperienced water heater salesmen, these data should be checked with a water heater specialist.

An appointment should be made with the prospect, preferably in the evening when both members of the family can be together, and the complete story told. With the well worked-out plan, a most interesting sales story can be told, costs justified, objections answered and in many cases the sale closed.

3. The third step is important whether the sale is closed in No. 2 or not. If the order is not given, the sale should be kept open by making an appointment for a meeting in the sales office where equipment is on display and where further help may be available.

If the order is given for a water heater, the same appointment should be made for an office meeting to show related merchandise and to build the desire for an all-electric home. It will be noted that this plan employs water heater specialists, but most of the active selling is carried on by the regular salesman.

2. **Highly-Trained Specialty Salesmen**—This plan is in use in several companies and revolves about the securing of well-qualified salesmen and giving them intensive training in the fundamentals of water heating. The first qualification is, of course, that the man possess the qualifications of an ordinary utility salesman. In addition to this he must be mechanically inclined so as to understand some of the difficulties involved in installing. His water heating training should qualify him to be able to give to the customer information in regard to operation and the water heating service that can be expected from the equipment.

It is not designed that he be able to tell the customer what his water heating bill will be, but that he will be able to inform his customer as to the average cost and the average total amount of his bill as experienced by other users having similar requirements. The only definite statement he is permitted to make is in the cost per gallon to heat water electrically.

This man first surveys the premises to decide on the proper location of the water heating installation. In most cases he is able to give the customer a price on an installation including the necessary plumbing and wiring costs. In some few extraordinary cases, however, it will be necessary to call a plumber and wiring contractor for estimates. This then is combined with the cost of the water heating installation itself and furnishes the basis for the figures which he will present to the customer. Thus the customer's obligation is confined only to the utility and the utility in turn compensates the plumber and electrical contractor.

These men also are used to satisfy complaints of high bills due to water heating. It must not be assumed, however, that these men are confined entirely to water heating. In many cases it has been found that these men, because of previous experience and qualification, can very readily make a range sale either in connection with water heating or as a step preceding the selling of a water heating installation. Primarily, however, his work is water heating and during the off seasons his time is confined to the survey of customers not using water heating and the contacting of present water heating customers to determine if the customer has any complaints in regard to his water heating service.

CONCLUSION

In conclusion, your committee wishes to point out that there are numerous types of equipment on the market. Because these types of equipment have been developed to meet certain requirements and as every property has conditions peculiar to its own territory, it is felt that a very thorough study must be made of the conditions existing within the company and the general conditions prevailing throughout the territory, and in light of these findings the selection made of the equipment which should be used in the promotion of water heating.

What has been said in regard to the type of equipment is equally true in regard to the sales methods which should be used. In addition to this, however, your committee feels that the plan employing well-trained salesmen has considerable merit and that this plan is workable not only in the development of the water heating load and in the promotion of sales where water heating service has already proved acceptable, but they are very important factors in assuring customer satisfaction. The utility feels that it has an obligation after the water heating installation has been made to see that customer satisfaction is continued. Upon continued customer satisfaction is dependent future load building. This phase is especially important as has been shown by our present conditions and, therefore, should merit considerable consideration by the utilities.

It is apparent that a consensus of opinion as to an accepted sales method is not seen by the committee. It would seem, however, that a company interested in water heating to the extent of its promotion also would be interested in sound and satisfactory sales, and the holding of these customers. The accomplishment of these results could best be made by highly-qualified specialty men, capable of handling a deal completely, from the approach to customer satisfaction, with as few calls as possible.

It is not intended that this report be a conclusive survey of this section, but that it is rather a limited report on information received from members of this committee. There are undoubtedly other programs and methods which are proving equally workable; therefore, this report has been intended to cover only the specific cases under consideration which had been reported upon by members of the committee.

*Home Appliance**

THE committee was unable to meet to discuss the various phases of the sale of home appliances, but an effort has been made through correspondence to get some ideas on the present-day practices of the various utilities represented and also the trend of thought concerning future activities. In order to do this, a questionnaire was sent to each member of the committee. The questions asked and composite answers follow:

Q. 1—From a load-building standpoint, are the utilities justified in spending any great amount of time and money promoting the sale of small home appliances?

A.—Neither the profit nor the load derived from the sale of such items will justify the spending of any great amount of time or money on the sale of such items. However, they have a very definite place in a well-balanced load-building program and should be given a place in promotional activities in keeping with their relative importance.

Q. 2—To what extent does the sale of small appliances pave the way for the sale of major items such as ranges, refrigerators and washing machines?

A.—A large percentage of homes have small appliances such as flat irons, waffle irons and percolators before acquiring the major items; therefore, it is reasonable to assume that these small electrical servants have a very definite part in familiarizing the housewife with the use of electricity for household purposes and in this manner pave the way for the sale of other items of greater importance both to the customer and to the utility.

Q. 3—Would the present high saturation of small appliances be as great as it is had the power companies not lent their support to the pioneering of such items? What, in your opinion, is the proportion of present saturation due to power company effort?

A.—Just as it took years of constant effort to obtain public acceptance of the railroad and the automobile, it has taken many years of constant advertising and personal contacts on the part of power companies to bring about the present degree of public acceptance of electrical household appliances.

During this so-called pioneering stage, the cost of carrying on our educational sales program has undoubtedly exceeded the profit derived from the sale of all such appliances. The average merchant is not interested in displaying any new piece of merchandise until it has gained at least a certain degree of public acceptance, and for this reason dealers other than utilities have had a comparatively small part in bringing about the present saturation of electrical household appliances. In recent years their interest in such items has gradually increased as public acceptance has grown.

Q. 4—Now that these appliances are well beyond the pioneering stage, is it your opinion that the sale of such items will go along without the active aid of the utilities, or will their participation sufficiently increase the total volume to justify their engaging in the sale of these appliances?

A.—The preponderance of opinion among the members of the committee is that through the joint efforts of utilities and dealers enough additional volume will be secured to more than justify their continuation in the field. It should be the duty of the utilities to continue to carry the greater portion of the burden of promoting new devices as they appear from time to time.

Q. 5—Is your company at the present time actively engaged in the sale of small home appliances? If so, do you make special campaign offers?

A.—Four of the six companies answering carry a representative line of appliances in their stores, and two of such companies make special campaign offers. In all such cases activities are limited to inside selling. No outside canvassing is done by any of the utilities represented.

Q. 6—If special offers are made, are your local dealers given an opportunity to participate?

A.—All companies represented have in the past enlisted the services of the dealers on a cooperative basis and those still active are continuing to do so. One company reports that each month a special offer is made on one appliance and that the dealers are invited to participate on the same basis. The particular appliance featured is sold to the dealers at slightly more than ledger cost and their time contracts are taken over by the utility at the end of the month.

Q. 7—Do you offer terms on small home appliances? If so, what terms and what carrying charges are added?

A.—Of the four utilities still active in the sale of small home appliances, all are offering terms of from two to five months. Down payments range from 15 to 25 per cent.

Q. 8—Would the volume of small appliance sales be just as great if all dealers, including the power companies, sold such items for cash only or on 30-day accounts? If not, how much do you think the sales volume would be affected by such a policy?

A.—Five of the six members of the committee expressed themselves as believing that sales would be materially reduced if all time-sale privileges, other than 30-day charges, were eliminated. Suggested percentages of reduction ranged from 25 to 60 per cent.

Q. 9—There is a tendency on the part of some manufacturers to produce what we might call a utility line of such items as waffle irons, toasters and percolators. These appliances mechanically are just as good as the higher-priced lines, but certain sacrifices have been made in trimmings, etc., in order to hold down the cost. Do you believe that customers, buying such utility appliances rather than the higher-priced items, will be inclined to use them every day in the week rather than put them aside as ornaments only to be used occasionally?

A.—The unanimous opinion of the committee members was that this was a step in the right direction. Such appliances may now be sold on a basis of "service" rather than the "pride of ownership."

SUMMARY

In summing up the reactions of the various members of the committee to these questions, it is evident all are agreed on the following points:

That small appliances should have a place in the general line-up of current-consuming devices, and that a reasonable amount of time and money should be expended in the promotion of such items.

It is the belief of all concerned that the time has come when other legitimate merchants should be given an opportunity to share this business on a fair and equitable basis.

That all utility promotional plans take into consideration the interests and legitimate rights of all dealers.

Due to the fact that the dealer has no particular reason to become interested in a new piece of merchandise until it has gained a reasonable degree of acceptance, the utilities should continue to shoulder the burden of pioneering such new items as they appear from time to time.

Another very important angle to this situation is the maintenance of quality, and it is generally agreed that it will be the responsibility of the utilities to uphold the standard along this line.

General approval is given to the plan of the standard manufacturers in bringing out a line of low-priced quality merchandise which will enable all dealers to combat the cheaply-constructed products of the fly-by-night manufacturer.

There seems to be some difference of opinion concerning the effect which the utility small appliance sales activities may have on dealer relations. A closer contact with all dealers is suggested and as a result of these contacts a better understanding will prevail; once the confidence and friendly cooperation of the dealer is secured, he readily will appreciate the valuable assistance rendered by utilities in diverting a greater portion of the total dollars spent by the buying public into electrical channels.

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*Report of the home appliance committee, residential sales bureau, Sales Section, Guy E. Davis, Pacific Power & Light Co., chairman.

Idaho Power Co.: F. M. Ingraham.
Mountain States Power Co.: Fred Hartt.
Puget Sound Power & Light Co.: Harry E. Dingle.
Utah Power & Light Co.: Geo. B. Earl.
The Washington Water Power Co.: J. J. Fox.

*Home Lighting**

THE three-year plan announced by this committee last year recognizes that a vital part of the activity is to create in the minds of the domestic customer an acceptance of shaded light (of eyesight conservation) and that lighting must be sold from the standpoint of an appeal to beauty in the home, to health, comfort and convenience.

Last year, we found that a challenge had been issued to the industry by the average home-dweller.

THE CHALLENGE

1. One out of every three fixtures unquestionably is obsolete.
2. Shaded light is the exception rather than the rule.
3. 30 out of every 100 lamps in sockets are 15 and 25 watts in size.
4. People are allowed to feel electric light is expensive.
5. The homemaker is satisfied with the costs of electricity for labor saving devices, but is not satisfied with lighting costs.
6. Prevalence of defective vision is ignored.
7. Inadequate standards of wiring are employed commonly.
8. Interest and sympathy of all possible cooperating forces are not employed.

How often do we enter the average home and find electrical appliances for which we have created a demand and which cannot be used adequately because the customer has no outlet to attach the appliance cord to? Furthermore, is it not a common practice for our customers to ask us to explain the cost of operating an appliance or to show them how to compute their electric service bill, so often called an electric light bill?

Many of us have given little or no thought to the development of residential lighting load during the past few years, possibly due to the fact that our interests have been drawn to other lines. The result has been that the basic load builder of all central stations has been left to grow like Topsy "just growed." Have we realized the possibilities that exist in the average five room home?

Let's examine this table for a moment:

	Average Connected Load Watts	Conservative Ideal Watts	Per Cent Saturation
Living room	252.0	540	47
Dining room	158.3	230	69
Kitchen	86.5	200	43
Bedroom	98.0	190	52
Bath	70.9	100	71

Some might question the valuation of our conservative ideal. Take the kitchen, for instance—in estimating this we are asking only for a minimum of one 150-watt daylight lamp in the center fixture and one 50-watt inside-frost lamp in an appropriate unit mounted over the electric range or over the sink. Certainly this is conservative.

What are the possibilities of relative revenue building per dollar initially invested by the consumer?

	Average Retail Price	Annual Revenue	Ann. Rev. per Dollar Spent for the Device
Lamps, 40-watt	**$ 0.20**	**$ 0.78**	**$3.89**
Irons	4.59	4.32	0.94
Cookers	6.70	6.00	0.88
Indirect floor lamps, 300-watt	**25.00**	**18.00**	**0.72**
Toasters	5.50	3.00	0.55
Heaters	4.75	2.40	0.51
Ranges	150.00	60.00	0.40
Percolators	4.75	3.00	0.39
Waffle irons	7.78	1.80	0.23
Refrigerators	250.00	26.40	0.11
Ironing machines	76.99	7.59	0.10
Fans, desk	14.00	0.96	0.07
Cleaners	55.00	1.16	0.04
Washing machines	104.50	1.44	0.01

*Report of the home lighting committee, residential sales bureau, Sales Section, Walter E. Potter, Incandescent Lamp Dept. of General Electric Co., chairman.

General Electric Supply Corp.: Elmer Jonnsen.
Idaho Power Co.: O. C. Mayer.
Mountain States Power Co.: Henry Goldson.
The Washington Water Power Co.: L. V. Ross.

When you consider that, from the above figures, it only requires one or two floor lamps to equal the revenue produced by one refrigerator and about three floor lamps to equal the revenue of one range, this should prove conclusively that the residential lighting field has greater possibilities than any other part of our residential service. We defy any of you to place more than one refrigerator or one range in the average home, but you can place an almost unlimited number of floor lamps in the home; in fact, even in your own home you undoubtedly have several in the living room alone, as well as more than one in many of the other rooms.

THE ANSWER—TEN POINTS OF CONTACT

It is estimated conservatively that the residential lighting load is productive of approximately 62 per cent of the total domestic revenue, and but 52 per cent of the total domestic energy sold by the utilities. It is recognized that much of this output has resulted not from a sustained directed activity in the sale of energy for light, but as a natural consequence of the present-day necessity for illumination. The public, with few exceptions, has not had proper instruction or guidance in the selection of luminaries and has endeavored to select its own lighting equipment with the natural result that, through ignorance of the disadvantages of inadequate or poorly-distributed light, a natural desire to economize on the light bill, in most cases, has defeated its own objectives.

It is obvious that the correction of these conditions would result in benefit to the public by giving it good lighting from artistic fixtures; to the fixture industry through the manufacture and the sale of lighting equipment properly designed to meet modern demands; to the contractors through the work resulting from changes in wiring and the fixture hanging which will become necessary; and to the utilities, who will benefit by selling more energy for lighting service.

1. **Sell Lighting Fixtures**—In order to meet adequately the challenge of the home lighting market, it is elementary that the newer forms of lighting equipment shall have an appeal that will make the older types appear undesirable. The customer cannot be approached effectively with discussions of an engineering character, but must be appealed to from the standpoint of decorative harmony, beauty, comfort and health.

The desire to possess good fixtures to the extent of being willing to undergo the necessary expense in their purchase and installation must be encouraged through the emotions and not through intricate scientific reasoning. As in the case of refrigerators, radios, sweepers and other electrical appliances, the public must be appealed to through the service rendered and the emphatic desirability for the new equipment, rather than through statistical or technical arguments.

Good lighting equipment must be sold by stressing such points as the beauty and honesty of design, the lasting quality of the materials and workmanship; the happy manner in which the fixture not only performs its function as an illuminating device, but becomes an important element in the home decorative scheme both by day and by night.

During the past year, two of the utilities in this territory conducted lighting fixture campaigns which reached into every home, large and small. Even the minimum bill customers were reached by these new lighting units as they are designed to meet three main factors: (1) an obviously increased current consumption; (2) an honest and appreciated service to the customer; (3) an elimination of sales resistance through a low initial cost. One company, with a dealer cooperative campaign, reached 65.7 per cent of its quota, with a coverage of 18.8 per cent to its total residential customers. It was interesting to note that the districts in which the highest percentage of total residential customers were contacted were the districts attaining the highest percentage of quota.

Another utility engaged in a similar activity. All employees first were called into a general group meeting at each division, where the campaign was outlined in detail and reasons for employee participation explained. At these meetings, the employees were given a lighting presentation covering the simple lighting principles and sales arguments. This utility showed employee participation of better than 75 per cent, with a total of 3,859 units sold. With each and every em-

ployee given a quota of three units to sell, it was found at the finish the quota reached was 179 per cent. Each unit sold required one 150-watt inside-frosted Mazda lamp, and on a basis that each unit replaced a maximum of a 60-watt lamp, the increased load as well as revenue readily can be figured. If nothing else was accomplished from this campaign, it developed a closer cooperation between the various departments of the central station, as every employee realized that his job was coordinated and dependent upon the other employees. Every employee entered this campaign, from the president, who actually sold his quota, down to the janitor.

2. **Conduct Empty Socket Activities**—One of the utilities in this section during the past year carried on a Mazda lamp selling campaign among its own employees, with full cooperation of the dealers within their respective territory. Newspaper advertisements were run in the regular papers, supplemented by stuffers placed in all electric service statements. It is estimated that 10 per cent of the active sockets are empty; if we fill only one of these with one 40-watt lamp, we will during the life of the lamp increase the revenue $2.32. Your committee urges each utility to consider this activity in cooperation with the incandescent lamp manufacturers; you can assist in working out a complete campaign with full support of the dealers. This activity certainly opens up our largest field quickly.

3. **Promotion of Home Lighting Through Advertising and Publicity**—Today we find practically every magazine and women's publicity of a national circulation carrying columns and pages of general information and reading material on proper home lighting in all its phases. Publications such as "McCalls," "Woman's Home Companion," "Ladies' Home Journal," "Pictorial Review" and many others carry this message into the home for us. It is up to us to tie in locally with direct newspaper advertising of a general nature, supplemented by direct mail to selected prospects. One central station last year used their regular advertising space in the newspapers to carry this message to the local people. Several other utilities are planning a similar activity this year. Every phase of residential lighting is discussed in these articles, including adequate wiring and even ultra-violet irradiation.

In this connection, we urge each utility to consider the education of its own employees on residential lighting, particularly the home-service women. Recently, your committee found a home-service woman who could not explain what a kilowatt-hour was to a customer or even figure the operating cost of an electrical appilance. It is surprising how many of our employees who are constantly called upon by the public to explain the simplest of questions regarding the basic part of our business cannot answer these fundamental questions.

The incandescent lamp manufacturers have published a complete set of home-lighting lessons for the use of central stations among their employees. These have been used in several properties in this territory. In some cases, every employee was required to take the course; in others it was left to the individual. Where every employee took the course, an elimination in the number of complaints for apparent high cost of electric service was noted.

If our industry is to carry forward, we must carry the message to the customer that ELECTRICITY IS CHEAP when he considers it is his servant at his command. The simplest method to carry this message is through our own employees, and these courses serve to help educate first our own people, then our customers.

4. **Sell Portable Lamps**—Field surveys, supplemented by experience in many selling efforts, prove that every city offers a tremendous market for the sale of portable lamps. It is estimated that the average home contains but three portable lamps at the most. Lighting experts say that each family needs at least ten such lamps to enjoy the full beauty, eye comfort and safety that "portables" give so effectively and economically. There is an opportunity to put a portable lamp beside most every reading chair in the home, a portable lamp on either end of the davenport, a torchiere or a candlepiece in the hallway, two or more candles in the dining room, a lamp for every bed, a lamp or two for every dressing table, a lamp for every dark corner of a room; in all, an opportunity to put between twelve and fifteen portable lamps in every home.

Portable lamps can be sold in volume and at a merchandising profit. That has been proved not once, but many times. The local market may be somewhat different from the national average, but it can be sold. Lamps should be offered that are at once different, have artistic appeal and quality, and are priced so that the great majority of customers can afford to own them. Lamps of that character are available from the manufacturers. Cooperation with all local retail outlets of portable lamps is highly desirable, if not imperative.

Few electrical applications have a wider distribution by local retail stores than the portable lamp. Furniture stores, jewelry stores, electric shops, department stores and specialty stores have come to look upon the electric portable lamp as their own field and in most instances are making it a profitable source of sales revenue. The interest of these dealers should be aroused and the plan of making a special drive and periodic campaign as a concentrated and complete cooperative movement should encourage their participation.

Where the utility is not active in the sale of portables, the utility can sponsor a sales program, offer the sales department as a help. The combined publicity, educational activities, personal sales solicitation, window and store displays, and general concentration on such a movement unquestionably can be made to produce a larger volume of sales than if left to individual efforts.

Changes in decoration, new furniture, more varied uses and new styles have placed existing portable lamps very largely in the obsolete class. Every so often the period influence in home furnishings changes. For instance, Arts Exposition of 1925 in Paris created in this country a craze for the art moderne, and there was an influx of modernistic furnishings into thousands of American homes. However, the era of the modernistics lasted but a few years, and now the radical and extreme types of furniture and lamps no longer are popular —the decorative motif has changed. At present the vogue is Early American, French Provincial, 19th Century, English and Victorian. Thus we hear of the Chippendale, Sheraton, the Directorie and the classical periods, all of which call for particular designs, colors, materials and fabrics in the decorative scheme and in accessories, such as the portable lamps, necessary to create a pleasing effect and harmony.

Does the average American woman change her lamps or add new ones when she changes her furniture and redecorates in accord with the prevailing fashion and period? The vast proportion do not, but might if they were influenced by intelligent and persistent promotional effort on the necessity and utility of attractive portable lamps.

Educational effort through national women's publications, together with industry campaigns under way by furniture, rug and allied interests, are opening to women new vision and understanding of good taste in style and in decorative harmony. Retail department stores maintain staffs of stylists in their home furnishing departments so that they may carry the proper stocks and cooperate in correct furnishing of the home. This educational effort very definitely has created a desire and a new buying power in the minds of these millions of women for a change, for something new and different. Have we, as members of the electrical industry, taken full advantage of this opportunity to promote and sell the one thing that contributes as much as anything else to harmony, attractiveness, comfort, appreciation, utility and complete satisfaction in the various rooms of the home—correct and proper lighting?

Our promotional advertising and sales appeals should be directed towards the two principal facts in regard to the portable lamp, namely, utility and decoration. The average woman of the house is more concerned with decoration and the average man of the house with utility. The woman is interested in style, color, harmony and decorative effects of a lamp. The man is interested in securing a light source of sufficient volume and quality for easy reading and working, placed conveniently in locations that provide the greatest comfort and relaxation.

Both should be whole-heartedly concerned in eyesight conservation, particularly for the children in their study and

reading. The latter interests can be most effectively aroused and will prove a chief selling point in thousands of homes if forcibly brought to the attention of the parents.

5. Organize and Carry On a Home-Lighting Service Department—Central station executives must take the lead in this program of residential lighting development. First, through the development of a home-lighting specialist; second, if not a home-lighting specialist, we must develop our home-service group. The purpose of the home-service department is first to increase the kw.-hr. consumption and second to build greater goodwill through service in the home. This ideal is being only partially fulfilled when these departments are dealing primarily in appliances. A complete service in the home must include lighting; and inasmuch as there is a sizeable force of workers already established among central stations, the placing of the lighting specialist with these people is the most logical. Any educational development is dependent on contacts with the consumer, and our home-service women have these valuable contacts.

6. Sell Adequate Wiring in the Home—No finer piece of work could be accomplished than to draft a set of minimum wiring specifications or requirements, based upon consumer needs and desires, and to urge its adoption and promulgation by this body. Today, minimum requirements in house wiring in the Northwest are in considerable variance, and the effect is to retard rather than develop adequate wiring, for the simple reason that the public cannot understand such variations. If these were adopted in the large cities, then every other city could be urged to adopt this wiring standard in lieu of existing requirements. This would convince the home owner that the electrical industry is in complete accord with what constitutes good wiring practice for present and future needs.

In a survey conducted in employees' homes this last year, we found 4 per cent had no wall or floor outlets in the living room, 29 per cent had only one outlet in the living room, 32 per cent had none in the kitchen, 23 per cent had none in the dining room, 86 per cent had none in the bath. Further survey showed the following desired changes in lighting for all rooms:

	Per Cent
More plug outlets	40
Wall switches instead of ceiling pull-lights	5
Wall lights added in kitchen or bath	17
Extra lights added elsewhere	11
More portable lamps	24
New center light fixtures	16
Indirect type of lighting	14

Every outlet added in the average home means not only addition of lighting load, but the outlet is provided for a fuller appreciation of the present appliance load and its actual use.

7. Conduct Home Lighting Demonstrations Through Model Rooms, Model Houses and Company Stores—Several years ago, many utilities and local leagues fostered the building and equipping of model homes. Each of these homes quickly proved its worth, not only from an increase in real estate sale value, but from the business secured from a greater appreciation of the use of electricity in the home. Many major appliances were introduced and the demand created there. The same was true of the latest and proper methods of lighting. Your committee feels that this is now the time to start anew on this activity. Our appliance and cooking schools have proved that our customers will attend these openings, and the sales and load actually results therefrom.

The incandescent lamp manufacturers provide a home-lighting recipe chart for use in company stores, which can be placed along the side of the lamp socket for ready reference. This enables the sales person to select the right lamp for each socket, thus eliminating the danger of a customer getting a 25-watt lamp for a kitchen, as actually has happened.

If complete homes cannot be equipped with modern lighting, at least one or two rooms can be equipped with the newer phases of lighting, whether in a new or remodeled home or in company stores having a sales room using an electric kitchen or other rooms of the home.

8. Cooperative Sales Programs with Architects, Builders, Contractors, Optometrists and Women's Clubs—We feel that the optometrists are most important contacts. As soon as they know our function, they tell who needs proper lighting. It helps considerably to be able to tell a parent that his optometrist recommended a survey of the lighting conditions and subsequent recommendations for improvement, after the optometrist has discussed corrective lighting with his patient. We have found these men very eager for any information given them on the relationship of lighting to eyesight and they in turn can tell their patients how to correct the seeing condition in the home after the lens has been fitted to the eye.

The Nela Park home-lighting program in several film slide lectures covers the various phases of lighting in the home, knit customer relations closer, as well as opening many leads in talking before various women's groups interested in better lighting. Every utility should have these film slide lectures in its home-service department, as well as others recently issued by various authorities. Work of this nature tends to knit customer relations closed, as well as opening many leads for increased lighting load through a better appreciation of the ramifications of proper lighting.

9. Sell Decorative and Seasonal Lighting—Last year your committee made a list of monthly recommendations for home lighting activities. A number of them have been used by various properties, but no utility has carried a real month-to month constructive program. The two months receiving the most prominence were January, a health month featuring the use of sun lamps for sunshine, for adults, children and babies; and July and August for garden lighting.

One company last year carried a rather comprehensive program on garden lighting, through newspaper advertisements and direct mail contact, through letters and folders to selected members of various garden clubs and women's clubs. Personal calls by representatives of the lighting-service department resulted in several jobs being closed. Many lighting equipment manufacturers have complete campaign material available for such activities, and are anxious to cooperate.

10. Conduct Lighting Programs With the Home-Service Department—A number of our utilities regularly are conducting demonstrations on various electrical cooking appliances in their own company stores, or cooperatively with local newspapers or retail stores. Usually during these demonstrations, while the food is being cooked, there is an opportunity to add interest to the program by interspersing a short talk, demonstration or playlet on some appropriate home-lighting problem.

The General Electric Mazda lamp manufacturers have prepared an elaborate program embracing six different programs for such use. One of our utilities now is planning to carry this program out with its appliance schools and demonstrations. For instance, when the appliance demonstration is on electric refrigeration, the light talk can be on the use of indirect bridge light for general and partly lighting. On a meeting featuring pleasant party plans, the appliance demonstration will be with sandwich toaster, waffle iron, coffee maker and mixer, and the lighting talk and demonstrations on lighted table decorations.

These demonstrations offer an excellent opportunity to contact the residential customer and deliver two stories instead of one, providing diversity as well as real home interest.

Last, we submit for your consideration thirteen questions, asking each of you to check them as they might exist in your own home.

1. Is there a reading lamp by every easy chair in your living room?
2. Can you see readily from either end of your divan or davenport?
3. Can you see to play the piano without shadows?
4. Have you enough light for one table of bridge in the living room?
5. Have you enough light for three tables?
6. Can you look up telephone numbers easily with a telephone book at the telephone?
7. Are there enough portable lamps to make reading on the porch easy?
8. Is your wife's boudoir table lighted with lamps from each side?
9. Is there a bed lamp of the right height over the bed or a portable lamp alongside the bed?

10. Is there a portable lamp alongside the writing desk?
11. Is there a light on either side of the mirror in the bathroom to eliminate shadows when shaving?
12. Is there a light in the kitchen over the sink to eliminate working in your shadow?
13. Is there a duplex convenience outlet spaced along every 10 to 12 feet in each room?

How does your home check up?

Your committee feels that the time has now come to **Stop Talking About Cooperation and Unite in a Plan of Action!**

*Home Air Conditioning, Heating and Refrigeration**

IN VIEW of the extensive report submitted by the commercial and industrial air conditioning committee, covering all phases of the subject, including comfort cooling for the home, your committee has purposely omitted all discussion of the technical phases.

The use of air conditioning equipment in the Northwest has been confined largely to commercial and industrial establishments, with very few home installations to date. Answers to questionnaires sent out by the committee indicate that very little consideration has been given as yet to the possibilities of the home air conditioning field. Utility companies so far have confined themselves to the promotion of commercial and industrial air conditioning. Lack of money available for the promotion of domestic comfort cooling no doubt has been one of the chief causes for this condition.

The progress of comfort cooling for the home at this stage of its development depends largely upon the sales or promotional efforts of the utility companies. Indications are that no utility company represented in the Association contemplates the actual sale of home air conditioning equipment through its merchandising organization, and will, as soon as money is available, confine sales efforts to the promotional field.

The chief limitation to home air conditioning, in the minds of most utility executives, appears to be the matter of initial cost of equipment. A study of conditions in the Northwest indicates that most territories need only partial air conditioning, which can be supplied the customer at a reasonable cost. Manufacturers have developed and have available equipment to meet these needs. The next move appears to be up to the utility companies.

While the utilities' support in the development of commercial and industrial air conditioning is essential, it is absolutely necessary in the home air conditioning field, especially in the smaller towns, if the manufacturer is to market his product at a reasonable expense.

Your committee believes that four steps should be taken immediately by all utilities:

1. The appointment of an individual, or individuals, to assume the responsibility of sponsoring the promotion of air conditioning business in the territory.
2. The education of contact personnel.
3. The development of a home air conditioning customer educational plan.
4. Effect working arrangements with manufacturers and local retailers and the coordination of utility and dealer effort.

*Report of the home air conditioning, heating and refrigeration committee, residential sales bureau, Sales Section, Glenn L. Jackson, The California Oregon Power Co., chairman.
Northwestern Electric Co.: J. C. Plankinton.
Portland General Electric Co.: A. C. McMicken.
Refrigeration Engineering Corp.: D. W. Durcquer.
Utah Power & Light Co.: G. M. Gadsby.
The Washington Water Power Co.: R. B. McElroy.

RURAL SALES BUREAU†

THE WORK of the rural sales bureau for the past year has been concentrated largely on preparation of material for the agricultural handbook. Progress on this work is more completely reported below.

For the program of the annual Sales Section meeting in Portland, March 30 to April 1, the committee presented two subjects appearing to have immediate load-building possibilities in rural areas: electric soil heating and the latent steam boiler for dairy farms. Reports on these subjects also are appended.

*Electric Soil Heating Cable and Its Use in the Northwest**

By F. E. PRICE
Oregon C.R.E.A.

ELECTRIC soil heating has developed an entirely new field for the utilization of electrical energy, which at the present time is estimated to consume 150,000 kw.-hr. annually in the territory served by Portland wholesalers and manufacturers, and 83,700 kw.-hr. annually in the territory served by Seattle. The annual revenue at 3 c. per kw.-hr. this year will amount to approximately $4,500 in Oregon and southern Washington territory, and $2,500 in the Seattle territory, or a total of $7,000. I believe this a development worthy of careful consideration by the utilities and manufacturers and sales agencies of electric soil heating equipment particularly, when it is realized that this commercial development started late in 1931, continued through 1932 and three months in 1933 to date.

In March, 1931, when we first started experimental work on electric hotbeds, we were unable to find a manufacturer or dealer in the United States who was stocking electric soil heating cable, and we were obliged to have the cable made up on order. I believe it was in the fall of 1931 that electric heating cable was first stocked by dealers.

You may be interested in the amount of electric soil heating cable that has been sold in the Northwest to date. I have reports from manufacturers and wholesalers covering nearly all sales in Washington and Oregon.

Sales of Electric Soil Heating Cable

	Portland	Seattle
1931	6,000 ft.	2,563 ft.
1932	21,000 ft.	12,630 ft.
1933 (to April 1)	5,000 ft.	3,398 ft.
Total	32,000 ft.	18,591 ft.
Retail cost	$2,560	$1,488
Thermostats*	$1,020	$ 630
Connected load	220 kw.	150 kw.

*Average of 5 thermostats per 1,000 ft. of cable, at $7 each.

In addition to the sale of heating cable, there have been approximately 50 electric heating trays (size 30x40 in.) sold as appliances for soil heating in small plant boxes. These will have a connected load of 200 watts each, or 10 kw. These trays consume ordinarily about 100 kw.-hr. per month.

I will explain briefly my basis for estimating the power consumption of soil heating based on the amount sold. No. 19 cable is the predominating size sold and is used in 60- or 65-ft. units. Records indicate that each loop will consume on an average of about 4 kw.-hr. per day (24 hours) when in

†D. B. Leonard, Pacific Power & Light Co., Chairman.
L. C. Moore, Portland General Electric Co., vice-chairman.
The California Oregon Power Co.: T. W. Delzell.
Idaho Power Co.: R. S. Overstreet.
Oregon State College: F. E. Price.
Portland General Electric Co.: W. M. Hamilton.
Puget Sound Power & Light Co.: J. C. Scott, H. T. Heg.
University of Idaho: Hobart T. Beresford.
Utah Power & Light Co.: P. H. Craven.
Western Washington Experiment Station: Dr. J. W. Kalkus.

*A report of the rural sales bureau, Sales Section.

use. I have estimated an average use of 75 days per season. When used by nurserymen, as is the predominating use in the vicinity of Portland, the cable will be used from 4 to 10 months per year. Each unit of 65 ft. will, therefore, use about 300 kw.-hr. per season, based on 4 kw.-hr. per day and a 75-day season. There are approximately 15 units of cable per 1,000 feet, thus making an annual consumption of 4,500 kw.-hr. per 1,000 ft. of No. 19 soil heating cable. At least 75 per cent of this soil heating load comes between 8 p.m. and 7 a.m.

J. C. Scott, of the Puget Sound Power & Light Co., referring to activities in electric soil heating in his territory, stated:

> "The encouraging thing about the hotbed business is that where one section was installed last year, some customers are putting in four, five and six this year. Another encouraging point is that we are getting installations scattred throughout the extremities of our territory. Heretofore, practically all of the installations have been around Seattle, Tacoma and Puyallup. Interest in electric hotbeds is certainly growing and if people had the money there is no question but that there would be a big business in hotbed installations."

I have given you some idea of the extent of the sales of soil heating cable and the kw.-hr. annual consumption resulting from this new connected load. For the benefit of those who are not familiar with construction of the cable or its use, some explanation along this line probably is in order. The soil heating cable consists of nichrome wire which is covered with a layer of asbestos, which in some cases again is wrapped with a material such as cambric and protected with a flexible lead or copper sheath. The cable is buried in the soil. No. 19 is the size of nichrome wire that is used almost exclusively by the trade at the present time. It is used in 60 or 65 units for 120 volts and 65 ft. draws 440 watts at this voltage. This length of cable commonly is referred to as a unit or loop when used on 120 volts; 130 ft. is the unit length on 240 volts.

A 65-foot unit is the usual amount of cable used for a 6x6-ft. bed of soil. This gives a spacing of 7 in. between the cable in the bed and gives a wattage of 12 watts per sq. ft. of soil.

While the commercial expansion in electric soil heating of any consequence occurred in 1932, experimental work began in this territory in 1925 when Glen Cushing of the Puget Sound Light & Power Co. built and used an electric hotbed and continued his experiments. Harry Garver of the Washington C.R.E.A. began his experiments in 1927. All the early experimenters used various arrangements for heating that caused little interest among growers until soil heating cable was imported from Sweden, and also until American manufacturers began to produce the soil heating cable in 1930 and 31.

We began our experiments with the use of electric hotbeds at the Oregon Agricultural Experiment Station in 1931. After two seasons studies, we published Station Bulletin No. 307, giving the results of this work and quite complete recommendations for installing and operating the beds.

It is the common belief of most people who are not acquainted with the facts that to heat the soil with electricity naturally would require so much power that the cost would be prohibitive. Fortunately, experiments proved the power consumption could be made very reasonable when the soil was protected on the side by a solid frame and covered with glass. This out-door hotbed frame with the glass covering is familiar to most of you, I am sure. The standard hotbed sash is 3x6 ft., therefore a 6x6-ft. bed would require 2 sashes. The principal use for these beds is in starting early vegetable and flower plants and growing them to sufficient size to transplant to the fields or other beds. Another very important use for heating cable is in heating propagating beds for cuttings. Rooting of many kinds of cuttings is hastened by maintaining the sand or rooting media at the base of the cutting at a warmer temperature than the air surrounding the top of the cutting. The remarkable results which have been obtained in shortening the time required for cuttings to develop roots and the greatly increased number of cuttings which develop roots caused nurserymen to accept this new method almost as soon as the results of the first trials were made known. Outstanding progress has been made in getting installations in nurseries in the vicinity of Portland.

Some forcing of field crops of bulbs for early blossoms and early vegetable crops has been done by the use of electric soil heating cable under the rows. The California C.R.E.A. and University of California cooperatively have obtained splendid results from forcing gladiolas in field planting by electric heating cable under the rows. The Washington Experiment Station at Puyallup, in cooperation with the Puget Sound Power & Light Co., is conducting valuable experiments in the application of electric heat in the field with narcissus and rhubarb and asparagus.

Mr. Cushing reports that the narcissus field heating was done at 8:00 p.m. and 6:00 p.m. to study the effect on the crop when heated only during the off-peak period. You can see at once that this may develop a load for controlled off-peak service and, if so, will justify the application of a special rate.

New uses for electric hotbeds and electric soil heating cable are continuing to develop. Our latest development at the Oregon Experiment Station has been to use an electric hotbed for tuber indexing of seed potatoes. This is done by taking one eye from a potato and growing a plant 6 to 12 in. high to determine whether or not it has certain diseases. If the plant is found to be free from disease the rest of the eyes of that potato will produce healthy plants, so the potato is saved for seed. Otherwise, the potato is discarded.

It appears that we can get good results and grow the plants in 30 days by maintaining a soil temperature of 60 deg. F. We have maintained this temperature in a 6x6 bed during March with a power consumption of 3 kw.-hr. per day, whereas it took 5 kw.-hr. per day to maintain 70 deg F. in an adjacent bed of the same size.

We built and used 5 pig brooders during the past month and used soil heating cable for heating. They consist of a metal tray 2x2 ft. with 85 to 100 watts. There is an 85-watt unit of No. 30 cable that just fits this job. Two brooders can be placed in series by using 25 ft. of No. 23 soil cable for each brooder.

We are experimenting at the present time with a poultry brooder heated by soil cable suspended under a wire screen on which the chicks are brooded. This was done in an attempt to develop a simple home-made electric brooder to meet the demand that utility rural service men continually are finding. A 500-chick size can be built with a cost of material of $15. The experiments are continuing through this spring. The results so far are very satisfactory.

Soil heating cable is being used in poultry water heating. Also, last summer I installed 900 watts of soil heating cable in each of two flax retting tanks at the college, where a water temperature of 80 deg. must be maintained for several days.

A hot-spot electric heating cable has been developed in Portland for use in field heating crops, such as tomatoes or melons that are planted several feet apart. Also, there are two manufacturers of soil thermostats in Portland and a manufacturer of soil heating cable.

Every city or rural utility customer who grows flowers or vegetables is a potential user of an electric soil heating unit.

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*Rural Service Handbook**

By L. C. MOORE
Portland General Electric Co.

TWO years ago (1931), the rural service committee, under the chairmanship of W. M. Hamilton, proposed a rural service handbook. Plans were submitted to the executive committee and an appropriation was made with which to publish the book. Last year (1932), the rural service committee, under T. W. Delzell, again gathered material. However, not all of the subject matter was delivered. This year, previous material has been collected, some rewritten, some new material added, and all has been sent through a subject matter committee consisting of F. E. Price, Corvallis; Dr. Kalkus,

*A report of the rural sales bureau, Sales Section.

Puyallup; and Hobart Bersford, University of Idaho, to check on the accuracy of the material turned in and to offer suggestions for improvements. Now, most of the material is in the hands of the editorial committee for a strenuous boiling-down for placing in compact handbook form.

Considerable work is necessary before we can submit the material to printers for accurate estimates on the cost of publishing the books. Originally it was planned to use the appropriation in a revolving fund to publish the books and keep them up to date. But the plan now is to use the appropriation to publish as many books as possible, to be distributed free to member companies, with the idea that each company will purchase at cost as many additional books as needed.

This handbook will be made up in loose-leaf form so that sections may be revised or added from time to time. This handbook is not to be an encyclopedia on rural electrification, but rather a condensed collection on the essential performance data and operating characteristics of the various successful applications of electricity to farming. Several sections being prepared now will cover domestic water supply, dairying, poultry production, soil heating and hotbeds, irrigation, fruit growing, motor applications, hay and grain processing and general information on wiring and lighting. This book is intended not only as a ready reference for power company rural servicemen, but also for county agricultural agents, implement dealers, high school agricultural teachers and others. Particularly at this time, when rural service personnel of most companies is not adequate to cover the territory completely and rural service advertising is limited, these handbooks will be found especially valuable to place in the hands of county agents and others coming in contact with farmers.

It is felt that it will be sufficiently worth while to distribute these books among good implement dealers, high school agricultural faculties and others to justify the publication of additional books in case the allotment provided by the original appropriation does not completely cover the territory.

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*Load Building Possibilities of the Latent Steam Boiler for Use on Dairy Farms**

By D. B. LEONARD
Pacific Power & Light Company

THE latent steam boiler, or steam accumulator, is a new development which offers promise for water heating and utensil sterilization on dairy farms. Its principal advantages from an electrical point of view are, first, its ability to deliver live steam under pressure, and second, its 100 per cent load factor, using low-wattage heating elements operating practically continuously. It differs from the regulation electric steam boiler in having a larger water capacity, better insulation and low-wattage elements which continue to store heat in the water throughout the 24 hours for use during the relatively-short daily periods when steam is needed.

A number of installations in the territory served by the Pacific Power & Light Co. have proved its ability to fulfill all the requirements of the average dairy for hot water and live steam for washing and sterilization of dairy equipment. These installations also have served to prove that the load secured from the operation of this appliance is a satisfactory and profitable load for the utility. The demand, due to the low-wattage heating elements, seldom exceeds one kw., and the equipment is used winter and summer, requiring practically a continuous flow of energy 24 hours a day, 365 days each year.

This type of load is billed by our company on our uncontrolled water heating schedule, No. 36, at the flat rate of $6.25 per month per kw. of heater capacity. On this basis, and according to the operating characteristics observed from actual installations already made, we earn $75 per year for each kw. of heater capacity serving these dairy sterilizers. In addition to this revenue a small amount also is earned from the booster heater service, which is billed through the customer's regular service meter at 3 c. per kw.-hr., when emergencies arise necessitating the use of the booster heater to secure greater quantities of hot water or steam. For the purpose of this discussion, however, the booster heater revenue will be eliminated, and revenues will be calculated from the base heater alone, which operates without interruption except when the circuit is opened by the action of the pressure switch, set to open at a given steam pressure.

Small dairies marketing milk in cans and requiring hot water and steam for washing and sterilizing tinware alone, can be served with a latent steam boiler powered with a single 600-watt heater. Our revenue from dairies of this type is $3.75 per month, or $45 per year.

Small retail dairies sterilizing up to 12 cases of bottles daily, or large wholesale dairies, require a 750-watt heating element. Dairies of this size using this type sterilizer produce a revenue of $4.69 each month, or $56.28 each year.

Large wholesale dairies or retail dairies sterilizing up to 18 cases of bottles daily require a 1,000-watt heating element on the boiler to produce a monthly revenue of $6.25, or $75 a year. Still larger dairies may be served with proportionately larger heaters at an even greater revenue, as is the case with the Pendleton Dairy, which uses one of these sterilizers powered with a 1,200-watt heating element at a monthly operating cost of $7.50, or $90 per year. This particular sterilizer has been in service over a year and during the past twelve months used 10,183 kw.-hr. which were billed on our flat rate at $90, and figures an average rate slightly in excess of 8.8 mills per kw.-hr.

Of the 21 latent steam boiler dairy sterilizers now in service in the territory served by our company, ten are using 600-watt heaters, nine are using 750-watt heaters and only two are using heaters in excess of 1,000 watts each.

The annual revenue from these sterilizers is tabulated as follows:

10 boilers (600 watts)	@ $ 45.00	— $	450.00 annual revenue
9 boilers (750 watts)	@ $ 56.28	—	506.52 annual revenue
1 boiler (1,200 watts)	@ $ 90.00	—	90.00 annual revenue
1 boiler (1,500 watts)	@ $112.50	—	112.50 annual revenue
			$1,159.02 annual revenue

or an average annual revenue of $55.19 on each boiler in service.

These figures will show that during the past 18 months, when butterfat prices were the lowest in several decades, a sufficient demand was found for this equipment to enable us to make 21 sales and build an additional farm load that produces over $1,150 revenue each year. Many other dairymen have expressed their interest in this electric sterilizer because it eliminates smoke, soot, ashes and open-flame fire hazard from the milk house, and have expressed their desire to own one just as soon as butterfat prices return to normal.

While it is extremely hazardous to risk a guess as to the possible future sales of this equipment, it is quite apparent that additional sales will be made, and I shall attempt to analyze some of the future possibilities and interpret them in terms of additional farm revenue should they develop. A careful survey of the dairy industry has been made at Walla Walla and that city will be used as an example.

The 1930 census credits Walla Walla with a population of nearly 16,000 people. All of these people consume dairy products, and all of them are concerned as to the purity and wholesomeness of their milk supply. In order that all milk produced may be suitable for human consumption, the city commissioners passed the United States Public Health Standard Milk Ordinance and appointed a dairy inspector to enforce its provisions. This inspector has worked hard in assisting dairymen to meet the requirements of the ordinance, and has accomplished a great deal in the interest of health and dairy sanitation. He reports that 25 dairies now are licensed to sell Grade A milk in the city and that 51 additional dairies are producing Grade B milk for resale by creameries after it is pasteurized. Eight other dairies produce Grade B cream for bottle trade, to make a total of 84 dairies producing Grade B or better quality dairy products to supply Walla

*A report of the rural sales bureau, Sales Section.

Walla. All of these dairies are required to have an ample supply of hot water for washing dairy utensils and to have some approved system of sterilizing the equipment.

Of the 84 approved dairies, eight now are using the latent steam boiler dairy sterilizer and four are using electric water heaters. Several are using fuel-fired steam boilers and a few have resorted to chemical sterilization.

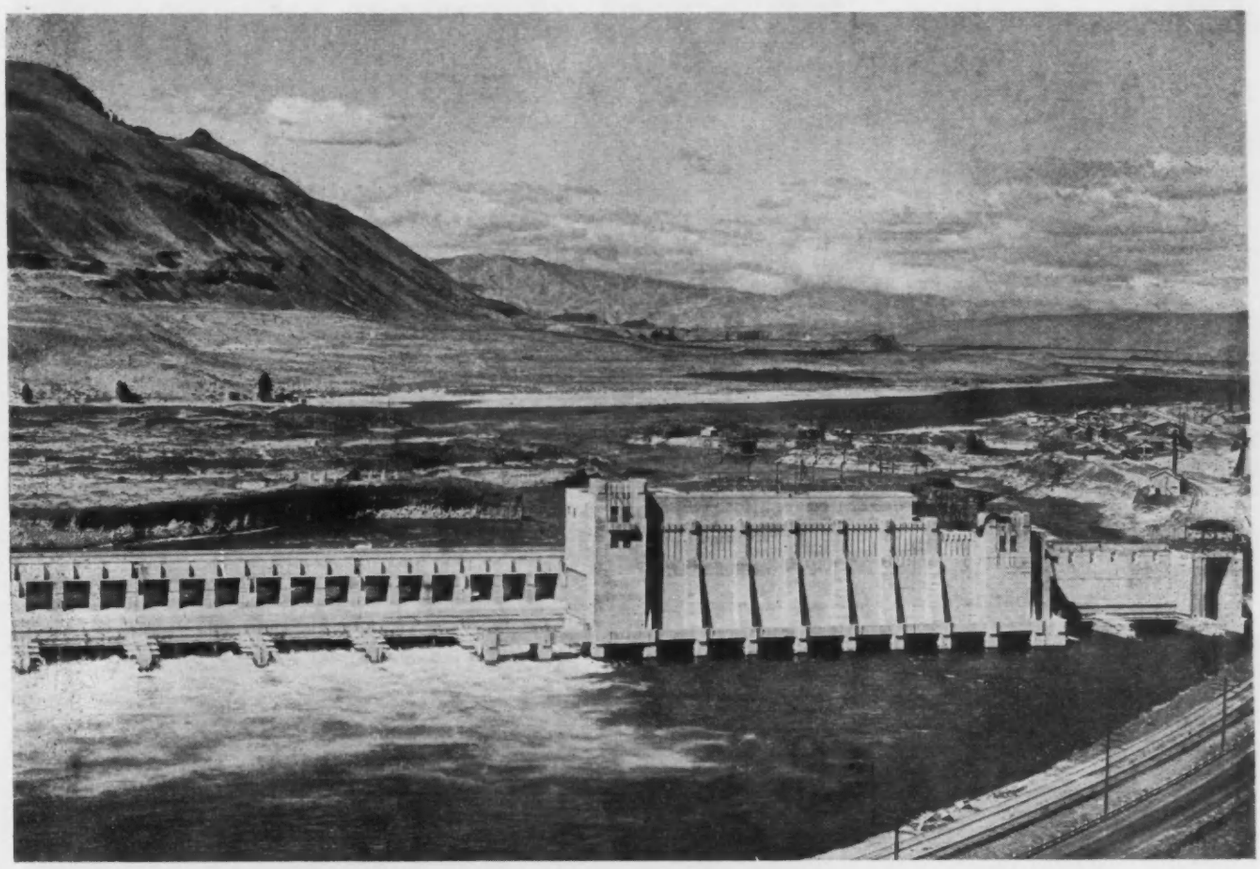
If within the next few years the price of butterfat raises to a figure that will yield dairymen a small profit above labor and production expenses, it is believed that 40 per cent of the Grade B dairies at Walla Walla will install electric water heaters or steam boiler sterilizers. Based on the present number of dairies, this estimate would mean 34 installations. As twelve installations already have been made, despite present low butterfat prices, it is believed that 22 additional installations would not require super-salesmanship to achieve.

If the present ratio between sales of dairy water heaters and steam boilers is maintained, eleven of the installations would be water heaters and 23 would be steam boilers. By using an average annual revenue figure of $35 for each water heater installation and $55 for each sterilizer, the dairy farm revenue at Walla Walla would be as follows:

11 water heaters @ $35 estimated annual revenue—	$ 385
23 steam boilers @ $55 estimated annual revenue—	$1,265
34 installations	$1,650

The response we have had from the users of this equipment and their expressed enthusiasm of the convenience, safety and cleanliness of electric dairy sterilizers would lead me to believe that this estimate is not an impossible goal to be reached.

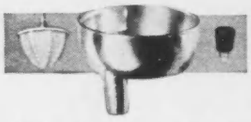
Referring again to the population of Walla Walla (16,000), it is apparent that a saturation of 40 per cent of dairy electric water heaters and sterilizers would produce an annual revenue of approximately 10 c. for each consumer of dairy products residing in the territory served by the dairy equipment. Such a saturation, with its accompanying farm revenue, is somewhat dependent on the adoption of satisfactory ordinances to compel dairymen to modernize their plants, coupled with the continuation of educational advertising featuring the wholesomeness of good milk and recommending greater consumption of these healthful dairy products. Progress in the dairy industry means the creation of additional agricultural wealth, which to the utilities means the development and sale of new equipment to make dairy farms an attractive and profitable class of business to serve. We hope that the work done by our company in developing and introducing the latent steam boiler for dairies will continue to earn additional revenue from this field, and that other power companies also may find in it possibilities for additional revenues from their dairy customers.



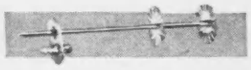
THIS MONTH! We crash the market...*hard!* with this new G-E mixer!

Here's what comes with it—

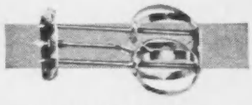
Two genuine exclusive Pyrex bowls



Juice extractor, extractor bowl, and oil dropper



Special two-disc drink mixer



Double bladed beater

RIGHT now the housewives in your town are getting their first look at this new General Electric Hotpoint Mixer in their favorite magazines. And you can safely bet that a lot of them will soon be out shopping for it.

For this is the most efficient mixer ever built! And it's the simplest!

It's different in design from any other mixer. Better in design. Its motor is in the base . . . where it ought to be . . . where the weight belongs. Result . . . you can't tip it over! Result number two . . . no motor oil can drop into the food.

News of this mixer breaks in the June issues of "Good Housekeeping" and "Better Homes and Gardens."

And your selling price? . . . only $19.95. That includes two exclusive Pyrex bowls, the double beater, drink mixer, juice extractor, and oil dropper. Food chopper with speed reduction unit $5.50 extra; grater $.50 extra; knife sharpener $.50 extra; banana creaming set $2.25 extra.

And remember . . . these June magazines are being read right now! So see your distributor . . . or write us . . . today!

Selling Features? . . . Look!

1—The most powerful motor ever put into a mixer selling for less than sixty dollars . . . 3 speeds.
2—Operates on either alternating or direct current.
3—Lubricated at the factory; user never need oil it.
4—Tilt-back neck; lets beaters drip into mixing bowl.
5—Automatic bowl control . . . regulates the bowl speed in mixing.
6—Cast metal juice extractor bowl . . . unbreakable.
7—Finished in Eden green baked enamel . . . won't chip, won't stain, easy to clean.
8—All accessories easily attached—no fuss or bother.
9—Guaranteed for one year against electrical and mechanical defects.

GENERAL ELECTRIC

Hotpoint

GENERAL ELECTRIC CO., MERCHANDISE DEPARTMENT, SECTION E-256, BRIDGEPORT, CONN.

AND...

We're telling the world about this brand new bargain!

Features that will make them say, "I'll take it!"

1—*Adjustable Automatic Control* . . . any heat you need for ironing . . . right at your finger-tips!
2—*Calrod Heating Unit* . . . you know what that means . . . this iron is practically burn-out proof!
3—*Button-nooks* . . . Women say "A blessing when ironing around buttons!"
4—*Thumb-rest* . . . they like this arm-sparing feature . . . found only on Hotpoint irons.
5—*Chrome plated* . . . mirror-bright finish . . . will never blister, peel or tarnish.
6—*Fast Heating* . . . the "Value-Matic" heats up in a jiffy . . . it's an 800-watt iron . . . and weighs 5 pounds.

GENERAL ELECTRIC

Hotpoint

GENERAL ELECTRIC CO., MERCHANDISE DEPARTMENT, SECTION E-256, BRIDGEPORT, CONN.

WE'VE put a midget price tag on a quality giant! We're offering (for a limited time only) a genuine General Electric Hotpoint iron (*automatic*, mind you) for only $3.95!

That's the kind of news that brings women in the front door! When they see a price tag that small on a real G-E iron... we don't need to tell you that *that's* going to start something!

We're calling this new General Electric Hotpoint Iron the "Value-Matic"... and we've put into it all the features that have made the name "General Electric Hotpoint" stand for the highest quality in electric irons. There's been no skimping—in anything but the price!

Millions of women are learning about the "Value-Matic" in the July issues of "Good Housekeeping" and "Better Homes and Gardens." And hundreds of these women live within easy shopping distance of your store.

And remember . . . July magazines appear *this month*. So see your distributor about this new "Value-Matic" iron—or write us without delay!

CONSTRUCTIVE COOPERATION

FRIGIDAIRE
GENERAL ELECTRIC
GIBSON
KELVINATOR
LEONARD
NORGE
SERVEL
UNIVERSAL
WESTINGHOUSE

Promoting Sales Cooperatively

Leading manufacturers of electric refrigerators, as listed above, are giving generous financial support to the Electric Refrigeration Bureau which for three years has been an important factor in promoting sales.

Through its advertising, through its field men, through its 500 local Bureaus, each carrying on local sales promotion, the Electric Refrigeration Bureau is constantly enlarging the market for electric refrigerators.

Local Bureaus invite the cooperation of all electric refrigerator sales outlets. Regardless of the brand of electric refrigerators you handle—no matter whether you are an exclusive refrigerator dealer, a hardware, electrical, radio or furniture merchant, your interest and cooperation is desired if you sell electric refrigerators.

In supporting the Electric Refrigeration Bureau you are fostering a most economical means of increasing the market for your electric refrigerator—for all electric refrigerators.

INVEST IN AN ELECTRIC REFRIGERATOR

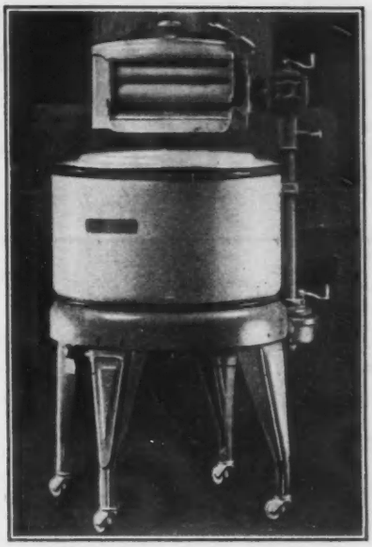
ELECTRIC REFRIGERATION BUREAU

420 Lexington Avenue, New York

Let's

"DECREASE THE LOAD"

with



This burdensome "load" of ever increasing household duties is effectively and *inexpensively* relieved at a very small cost for electric power.

G-E leads the way for greater "Household Happiness".

GENERAL ELECTRIC

Home Laundry Equipment, which is but a part of the complete line of Home Appliances now available with the G-E name and monogram, includes a wide range of models and sizes starting as low as $59.50 list.

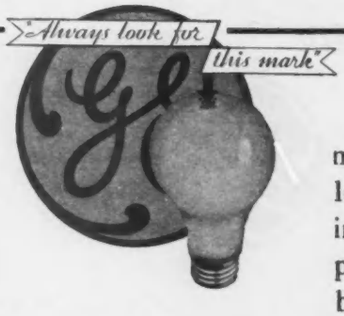
Utilize the "power" behind the name—GENERAL ELECTRIC—to help "decrease the load" of the homemakers of the west.

GENERAL ELECTRIC
SUPPLY CORPORATION

Offices and Branches in Principal Cities

SAN FRANCISCO OAKLAND SACRAMENTO LOS ANGELES LONG BEACH SAN DIEGO PHOENIX EL PASO
PORTLAND SPOKANE SEATTLE SALT LAKE DENVER BUTTE

TWENTY-FIVE KILOWATTS
TO BE ADDED BY SERVICE CALL



"The New Approach to Selling Lighting", using the Weston meter kit, uncovers opportunities to increase commercial load, as the following experience indicates.

The Lighting Sales Department of a certain utility obtained one of the kits and rotated it among its District Lighting Engineers, one week to each District. A District Lighting Engineer took the kit with him on a floodlighting service call from one of the company's industrial customers.

After taking care of the service call, the kit was mentioned to the electrical engineer of this industrial customer and demonstrated to him. He became enthusiastic and insisted that the plant superintendent see it. They were surprised at the low reflection factor of the buff, glazed tile brick which had been specified for the laboratory walls especially as a means of conservation of light. The brick walls and ceilings have since been painted a flat white color.

Similar tests have since been made in the plant, with the result that some 150-watt lamps were immediately changed to 200 and 300-watt lamps, and other 150-watt lamps will be changed to 200 and 300-watt lamps as replacements are made. Additional outlets in several departments will be installed when remodelling takes place. Thus, this service call brought about an immediate increase in load of 4½ kilowatts, which is expected to increase to 25 kilowatts very quickly. As a result of this, a lighting kit has been ordered for permanent use in this district.

A lighting engineer in another district of the company called on the manager of a new department store which is just being finished. After a demonstration of the kit, he was able to have installed 150-watt lamps in the basement where 60-watt lamps had been planned, and outlets scheduled for 150-watt lamps in the balance of the store got 300-watt instead.

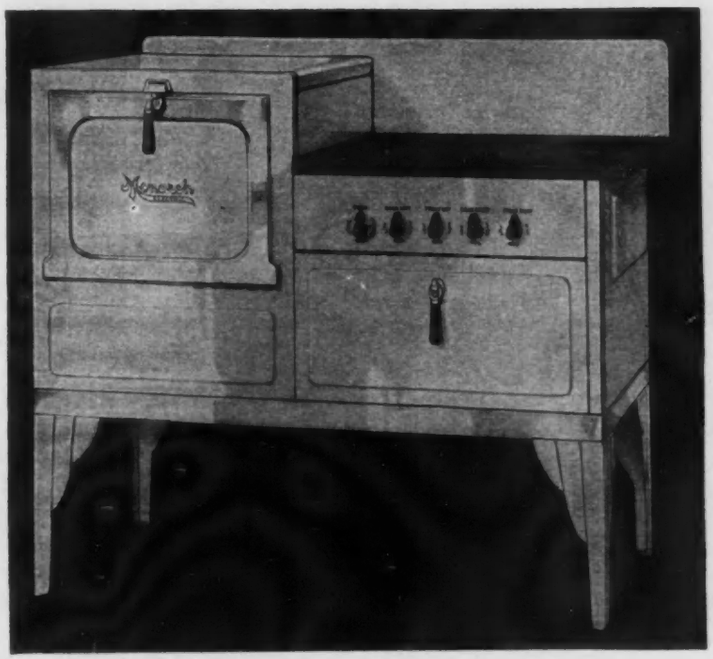
These illustrations of the success of this new plan are typical of many we are receiving from utilities who have adopted "The New Approach To Selling Lighting". It is meeting with amazing success wherever used. We will gladly place the information gained in the development of this plan at your disposal. Write to the sales division which supplies you with lamps. General Electric Company, Nela Park, Cleveland, Ohio.

GENERAL ELECTRIC
MAZDA LAMPS

New Features...New Beauty

NEW LOW PRICES

Styles and features that people want—at prices that people can afford to pay. A model to fit the requirements of every home. That sums up the Monarch line of Electric Ranges. The pendulum swings toward electric cookery. New outlets for electric ranges are being opened up every day. Competition grows keener as each new dealer makes his bid for trade. The shrewd merchandiser will succeed while others fall by the wayside. The selection of YOUR range is all-important. Monarch offers the values that will bring success. INVESTIGATE!



Generous in capacity . . . Ultra modern in design . . . Exceptionally reasonable in price

Model 17F, a range of outstanding merit in every respect. 17-inch oven protected with vitreous enamel and heavily insulated with rock wool. Automatic oven temperature control of special Monarch design which does away with the relay. Has illuminated dial.

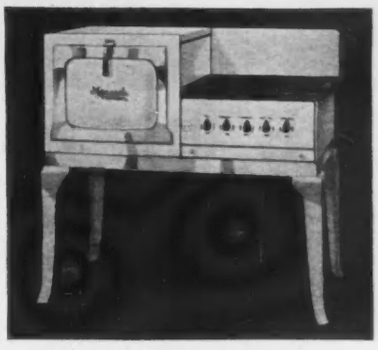
Cooking top of stain-proof marbleized green porcelain, with four surface units. Below, a large utility drawer. Electric timer-clock control, which never needs winding, offered optional.

All enamel, of course, and made in your choice of white, Nile-Green or Ivory-Tan.

Monarch

Refreshingly modern —and priced to SELL!

Model 95F, a modern console type range with 15-inch enamel lined oven and new type automatic temperature control. Door at left conceals operating panel when not in use. Electric timer-clock control. All enamel in beautiful two-tone Ivory-Tan with stain-proof marbleized top.

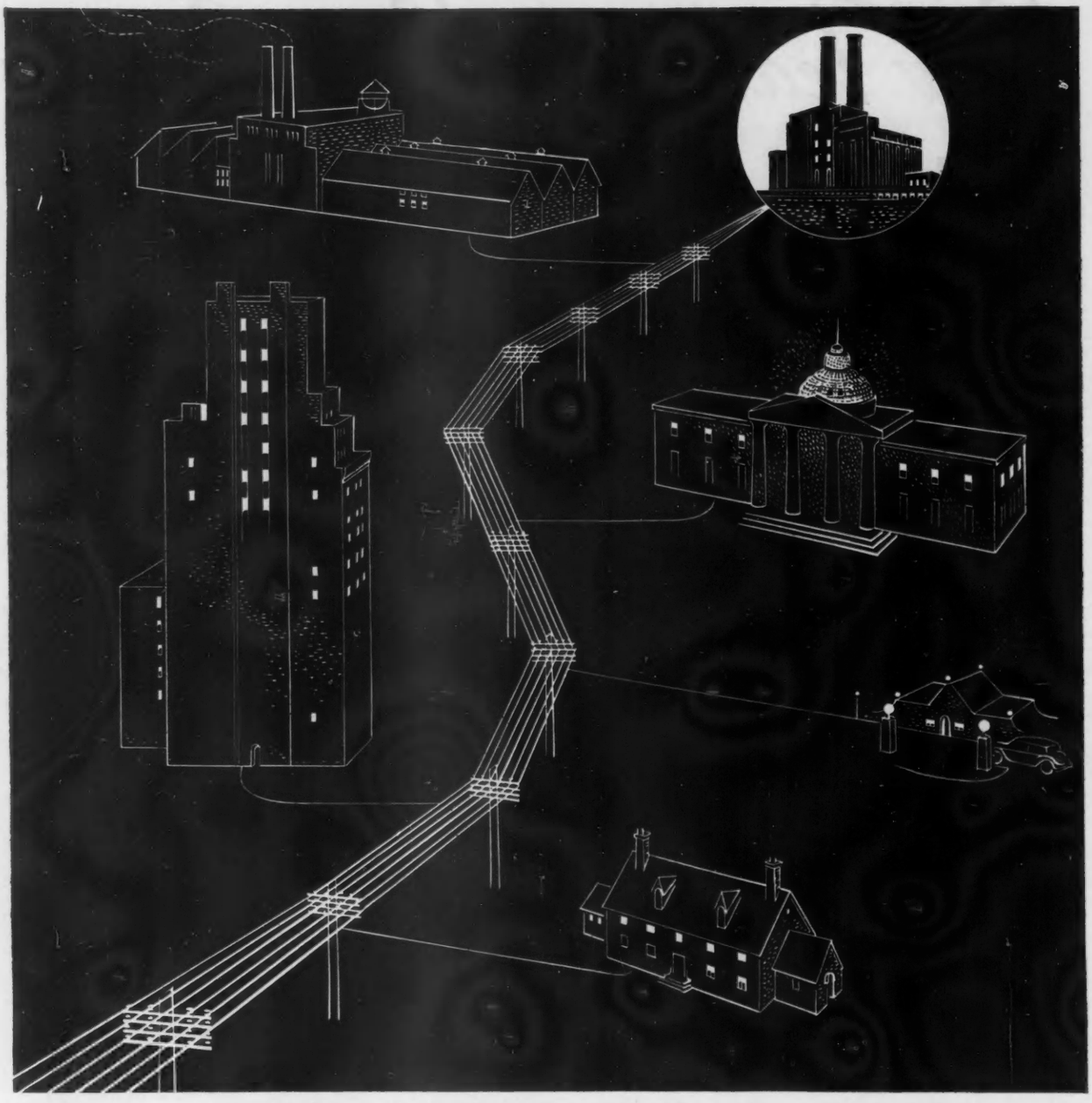


Model 47F, with 17-inch aluminum lined oven and new type automatic temperature control, eliminating relay and with illuminated dial. Electric timer-clock control optional. Four surface units set in stain-proof marbleized porcelain top. Body all enamel, with choice of white or the two standard Monarch tints.

MALLEABLE IRON RANGE CO., 311-A LAKE STREET, BEAVER DAM, WIS.

Branches in Coast Cities

Ceneral Station Representatives: Clyde L. Chamblin Co., 639 Mission Street, San Francisco, California
Dealer Representative: Glenn L. Brown, 3515 Kempton Place, Oakland, California
Northwest Representative: G. A. Lieser, 1218 17th Avenue North, Seattle, Washington

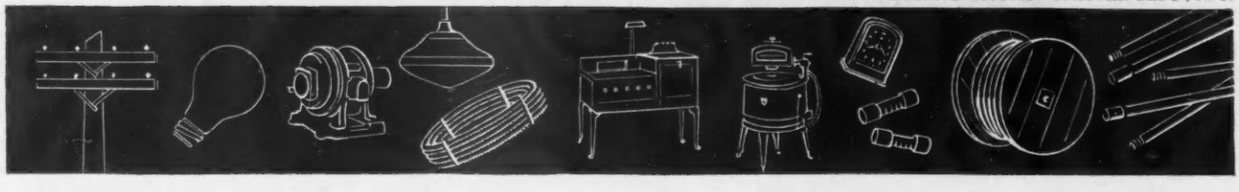


THE LIFE LINE OF A NATION

From the pole line of the power and light company flows the electrical life-current of the nation. From this vital artery comes the magic force that turns the wheels of industry . . . speeds up commerce . . . brings comfort to the home. ¶ Graybar helps keep this life line active in two ways. Graybar supplies the innumerable electrical products that build up its load. And Graybar provides an experienced service of supply on construction materials that is *complete, convenient,* and *economical.*

GraybaR

OFFICES IN 75 PRINCIPAL CITIES.
EXECUTIVE OFFICES: GRAYBAR BLDG., N. Y.



SAN FRANCISCO SEATTLE LOS ANGELES OAKLAND SPOKANE PORTLAND TACOMA

TEAR THIS OUT

Please have an Associated Lubrication Engineer call on me to discuss transformer oil. It is understood that I am not obligated in any way.
Name
Address
Firm Name

then forget transformer upkeep

You men who are responsible for maintenance costs should know about Avon Transformer Oil. You should know its fine qualities—know why it operates so efficiently—why it will run without sludging for a longer period.

REFINED AND RE-REFINED:

At Avon, Associated's modern refinery, up-to-the-minute equipment purifies Avon Transformer Oil to the highest degree known to science. The famous Edeleanu process carries away all sludge, all acid, alkali and sulphur. Then after many additional treatments this oil is ready to go into service.

TESTED AND AGAIN TESTED:

Avon Transformer Oil must score the peak mark in all ten exacting tests: gravity, flash, fire, viscosity, color, dielectric strength, pour point, corrosion, life test, neutralization number.

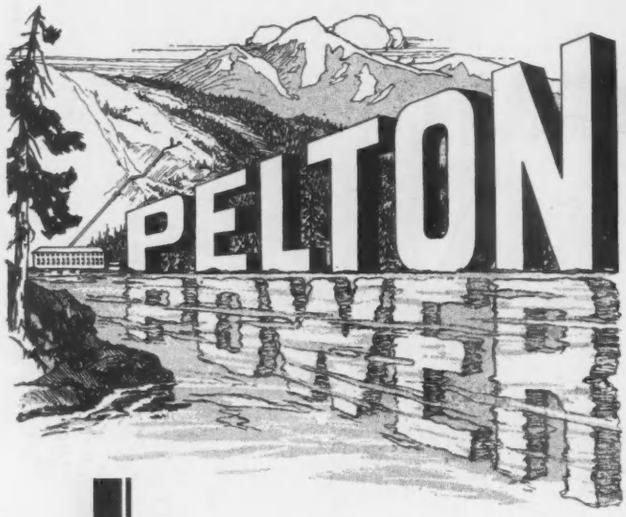
PROTECTED DIELECTRIC STRENGTH:

Of course you know how disastrous the slightest trace of moisture is to the efficiency of transformer oil's voltage resistance. Associated takes every precaution to guard against moisture in packing and shipping. Special tank cars, scoured, then thoroughly dried with warm air. For smaller lots, special cadmium-plated drums prepared in the same way. Careful filtering in the transfer to containers. Then samples are taken for re-testing. Not until final laboratory approval is the oil ready for shipment to you—sealed and safe.

Tear out the coupon. Drop it in today's mail. An Associated Engineer will call and explain how you can make a substantial saving by specifying Avon in your next order.

AVON TRANSFORMER OIL

A product of the Associated Oil Company, refiner and marketer of *"FLYING A"* Gasoline and Cycol Motor Oils and Greases.



The Trend Is Upward

Improving conditions are definitely indicated on the meters which register consumption of power and light. It is evidence of increasing demand for service which may be expected to accelerate as recovery continues. The efficiency and reliability of power production equipment becomes more important as the load curve swings upward.

Rehabilitation of hydroelectric plants at present low prices will return big dividends through improvement in efficiency, greater reliability, and reductions in operating hazard and cost. Pelton engineers are ready to assist in the execution of your rehabilitation plans.

The PELTON WATER WHEEL CO.
Hydraulic Engineers

Hydraulic Engineers

2929 Nineteenth Street San Francisco

PELTON

The Answer to Gas Competition

THERMADOR Water and Air Heaters solve this problem by providing SAFE, clean, economical heating the NEW way.

To POWER COMPANIES we offer the perfect load building line.

To DEALERS—Profitable merchandise.

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THERMADORS are seven leagues ahead. They have been developed over a period of eighteen years.

TO KNOW THE FACTS—Use them in your own home!

Write for catalogues and additional information.

THERMADOR ELECTRICAL MANUFACTURING COMPANY

Successors to HOFFMAN SPECIALTY CO. of California
EVERHOT ELECTRIC & MFG. CO.

116 Llewellyn Street, Los Angeles, Calif.

31% ANNUAL RETURN

from Increased Revenue Alone

by Investing in the NEW G-E Step Voltage Regulator

A 20-mile, 12,000-volt rural circuit of a southeastern power company presented the problem of narrowing a wide variation in voltage at the end of the line, as well as raising the general voltage level. This was accomplished by installing a G-E step voltage regulator, at a total cost of about one-half that of other methods.

Not only was this increasingly important problem in distribution—the maintenance of the desired voltage—satisfactorily solved, but in just a little more than three years the installation will have paid for itself from increased revenue due to voltage maintenance.

If you have delayed the regulation of suburban and rural circuits because of initial expense, it will pay you to investigate the new G-E step voltage regulator. For further information, address the G-E office nearest you, or Department 6-201, General Electric, Schenectady, N. Y. Ask for a copy of Bulletin GEA-1577.

The G-E step voltage regulator is designed for circuits of 4800 to 13,800 volts, three-phase, 50 amperes and less. Voltage range: 10 per cent buck-and-boost, in steps of 2½ per cent.

GENERAL ELECTRIC

Just Published—

This book presents a short treatment of direct and alternating-current circuits and machinery, with emphasis upon fundamental principles rather than upon mere factual information.

Direct and Alternating Currents

Theory and Machinery

by E. A. LOEW

Professor of Electrical Engineering, University of Washington, Seattle, Washington

650 pages, 6 x 9, 485 illustrations, $4.50

THIS book will be useful to engineers who desire a review or reference treatment of the more important theoretical elements of alternating and direct currents, with enough illustrations and problems to properly associate them with their application in commercial machinery.

Because of its importance, the electric circuit is treated in some detail. Sufficient mathematical treatment is included for making the usual circuit calculations, but the mathematical expressions used are limited to simple, easily-understood forms.

Alternating-circuit theory is discussed largely in terms of vectors, in the belief that this method is the most fundamental and, in the long run the simplest. In the discussions of machines and their operating characteristics, simple, rational explanations are attempted and, again, fundamental principles are emphasized.

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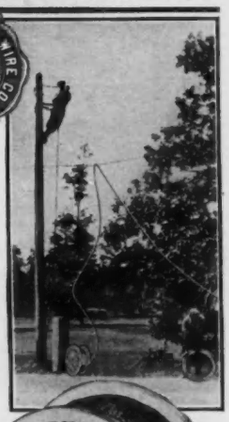

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Insist upon genuine *Crapo* Galvanized Wire and Steel Strand! Representative Jobbers in all leading distributing centers can supply your needs immediately.

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Muncie, Indiana

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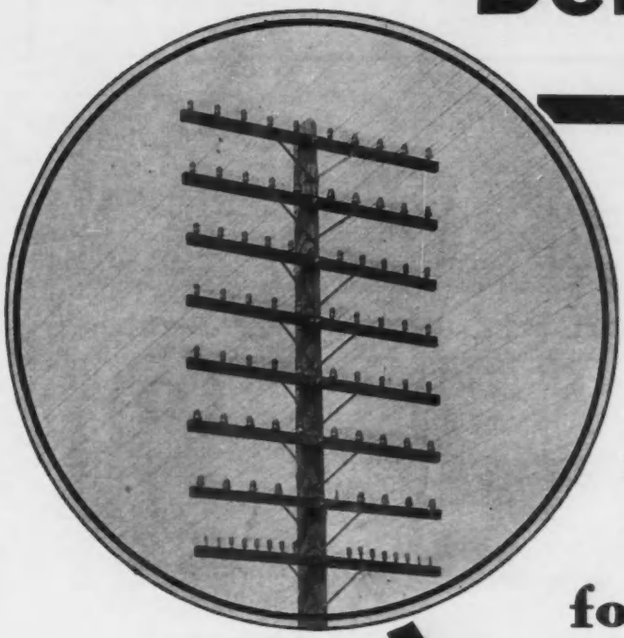

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more protection for your lines

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at no extra cost

--- won't shrink --- won't warp and they resist decay to a remarkable degree. They measure up to the most rigid specifications.

Correct Design
High Flashover Value
Low First Cost
Conveniently Located Plant
"A Pacific Coast Product for Pacific Coast Users"

McLaughlin Glass Insulators

McLaughlin Glass Company, Los Angeles, Calif.

Locust Pins -- Oak Brackets and Pole Steps

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MAYDWELL & HARTZELL
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FACTORY DISTRIBUTORS

LOS ANGELES SAN FRANCISCO

WHERE TO BUY IT IN THE WEST

This guide to products supplements The Manufacturers' Directory, published in the April, 1933 issue. Under the name of the appliance or equipment will be listed the advertisers of that product; by cross-checking with the listings in the directory, the local agents for any item thus can be found. If further information is desired, write to ELECTRICAL WEST, 883 Mission St., San Francisco, Calif. While the same care has been exercised in compiling this guide as in the directory, the publishers assume no responsibility for errors or omissions, but will make such corrections and additions as are requested within the restrictions set.

Air Conditioning
Frigidaire Corp.

Anchors, Guy
James R. Kearney Corp.
Maydwell & Hartzell, Inc.

Appliances, Household
Edison Gen. Elec. Appliance Co., Inc.
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
The Gute Co., Ltd.
Malleable Iron Range Co.
Mary Dowd Reardon Studios Ltd.
Swartzbaugh Mfg. Co.
Westinghouse Elec. Supply Co.

Distribution Specialties
General Elec. Co.
Graybar Elec. Co., Inc.
James R. Kearney Corp.
Maydwell & Hartzell, Inc.

Electrodes, Arc Welding
John A. Roebling's Sons Co.

Fans
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Fittings, Conduit
Steel & Tubes, Inc.

Fixtures, Lighting
Russell & Stoll Co.
Thomas & Betts Co.

Lamps, Masda
General Elec. Co.
Westinghouse Lamp Co.

Lamps, Vapor
General Elec. Vapor Lamp Co.
Keese Eng'g Co.

Lamps, Sun
General Elec. Co.
Graybar Elec. Co., Inc.

Lighting Equipment
Schleicher & Co., Inc.
Maydwell & Hartzell, Inc.
McLaughlin Glass Co.
Westinghouse Elec. & Mfg. Co.

Pacific Coast Steel Corp.

Public Utilities
Coast Counties Gas & Elec. Co.
Pacific Gas and Elec. Co.
San Diego Cons. Gas & Elec. Co.
San Joaquin Light & Power Corp.
Southern Calif. Edison Co. Ltd.
Southern Sierras Power Co.

Pumps
Pelton Water Wheel Co.

Ranges
Edison Gen. Elec. Appliance Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Malleable Iron Range Co.

IRONRITE

Dealerships Open!

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GORDON WILKINS
Sales Director
MARY DOWD REARDON STUDIOS, LTD.
3100 Telegraph Ave., Oakland
FACTORY REPRESENTATIVES

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Spaulding
Fibre—Spauldite (Bakelite)
Complete shops at Los Angeles

Irvington
Varnished cambric—tapes
Spaghetti tubing

Macallen
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Hope
Electric tapes and Sleevings

Manning Pressboard

Pacific Coast Stocks
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Los Angeles
1325 San Julian St.
San Francisco
1889 Mission St.

Batteries, Storage
Elec. Storage Battery Co.

Boxes
General Cable Corp.
Russell & Stoll Co.
Thomas & Betts Co.

Brackets, Wood
Locust Pin Co.

Bus Fittings
Burndy Eng'g Co.

Cable Accessories
General Cable Corp.
John A. Roebling's Sons Co.

Cables
General Cable Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
John A. Roebling's Sons Co.
Westinghouse Elec. & Mfg. Co.

Carbon Brushes
Morganite Brush Co.

Circuit Breakers
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Clamps, Cable
James R. Kearney Corp.

Cleaners, Vacuum
Cramer Elec. Co.

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REBUILT CLEANERS
Parts for all makes
Write for details
CRAMER ELEC. CO.
1301 W. Washington St.
Los Angeles, Cal.

Compounds, Insulating
John C. Dolph Co.
General Cable Corp.

Condensers, Electric
Allis-Chalmers Mfg. Co.
J. G. Corrin
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Conduit
General Elec. Co.
Steel & Tubes, Inc.
Youngstown Sheet & Tube Co.

Conduit, Underground
Johns-Manville Corp.

Connectors
Burndy Eng'g Co.
Electroline Co.
James R. Kearney Corp.

Cutouts
James R. Kearney Corp.
Westinghouse Elec. & Mfg. Co.

Fuses
James R. Kearney Corp.
Trico Fuse Co.

Gasoline
Associated Oil Co.

Generators
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Governors
S. Morgan Smith Co.

Heaters, Air
Edison Gen. Elec. Appliance Co.
Sandoval Sales Co.
Thermador Elec'l Mfg. Co.
Wesix Inc.
Westinghouse Elec. & Mfg. Co.
Edw. L. Wiegand Co.

Heaters, Water
Clyde L. Chamblin Co.
Edison Gen. Elec. Appliance Co.
Malleable Iron Range Co.
Sandoval Sales Co.
Thermador Elec'l Mfg. Co.
Wesix Inc.
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General Elec. Co.
Quality Elec. Co.
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Johns-Manville Corp.
C. D. LaMoree

Insulators
Corning Glass Works
Garland Affolter Eng'g Co.
Hemingray Glass Co.
Locke Insulator Corp.

Meters
Eng'g & Gen. Supply Co.
L. A. Nott
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.

Motors
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Motor Starters
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Oil, Lubricating
Associated Oil Co.

Oil, Transformer & Switch
Associated Oil Co.

Panel Boards
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Pins, Wood
Locust Pin Co.

Pole Line Hardware
Associated Wholesale Elec. Co.
Graybar Elec. Co., Inc.
Joslyn Co. of Calif.
Locke Insulator Corp.
Maydwell & Hartzell, Inc.

Poles
Maydwell & Hartzell, Inc.
Westinghouse Elec. & Mfg. Co.

Refrigerators
Frigidaire Corp.
General Elec. Co.
General Elec. Supply Corp.
Malleable Iron Range Co.
Westinghouse Elec. & Mfg. Co.

Relays
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Resistors
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Rheostats
Westinghouse Elec. & Mfg. Co.

Service Organizations
Elec. Refrigeration Bureau
Elec'l Testing Labs.
McGraw-Hill Book Co.
National Elec. Cookery Council
Neal, Stratford & Kerr
Northwest Elec. Light & Power Association
Pacific Coast Elec'l Ass'n
Pacific Coast Elec'l Bureau
Young's Adv. Agency

Signs, High Voltage
W. D. Howze Sales Co.

LITTLE GIANT Tray Washer

The entering Sales Wedge—profitable in itself—through its saving of space and convenient operation, opens the door to ironer and refrigerator sales.

Join the family of enthusiastic Coast Dealers with the idea of making some good profits in . . . 1933.

LITTLE GIANT INC. LTD.
1001-24th St., Oakland, Calif.

WHERE TO BUY IT IN THE WEST

(Continued)

Steel Products
Pacific Coast Steel Corp.

Switchboards
Allis-Chalmers Mfg. Co.

Switches, High Tension
James R. Kearney Corp.
General Elec. Co.
W. W. Kirk
Westinghouse Elec. & Mfg. Co.

Switches, Meter Test
Meter Devices Co.

Switches, Safety
Mongerson's Elec'l Mach. Works.

Switches, Time
R. W. Cramer & Co.
Landis & Gyr Co.
Sangamo Elec. Co.
Tork Clocks, Inc.
Triplex Products Corp.

Switchgear
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Tapes
Johns-Manville Corp.

Terminals, Cable
General Cable Corp.

Tools, Live Line
James R. Kearney Corp.

Towers, Transmission
Pacific Coast Steel Corp.

Transformers
Allis-Chalmers Mfg. Co.
American Transformer Co.
Electric Agencies
General Elec. Co.
Jeffries Transformer Co.
Sangamo Elec. Co.
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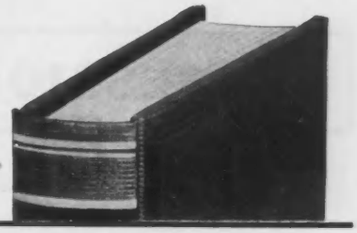

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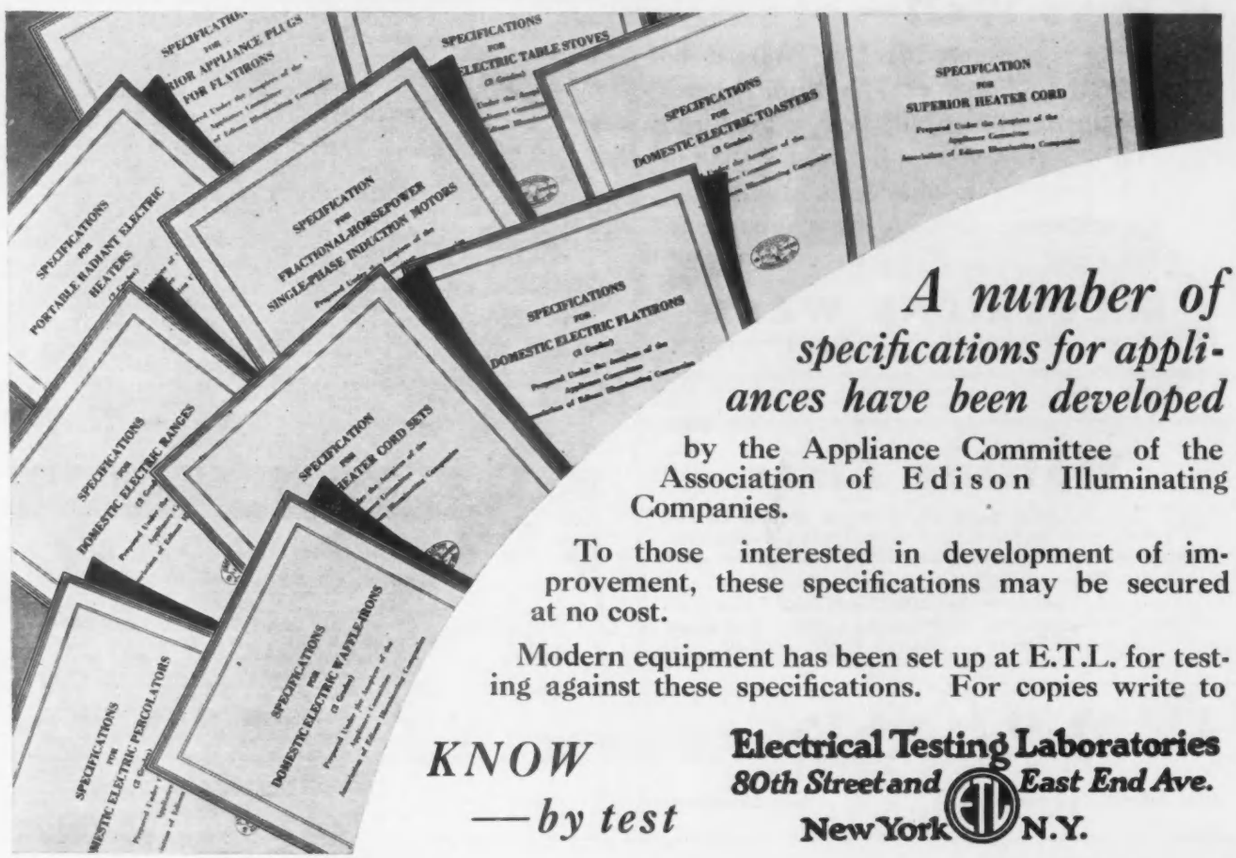
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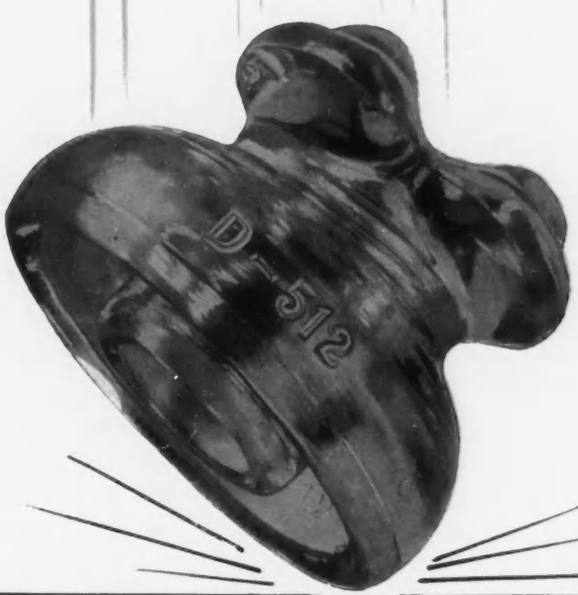

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